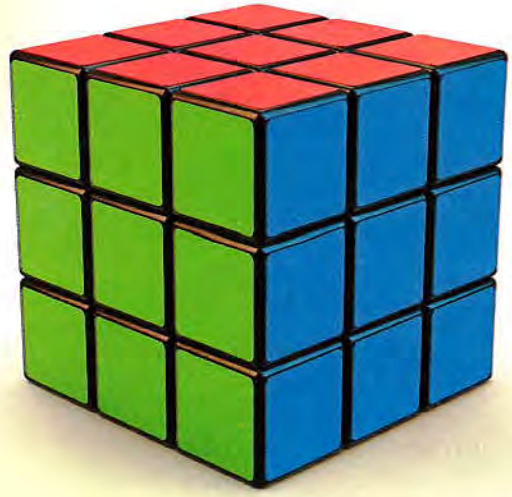
Exercise 1

The cube root of a rational number

From the school book



● Remember ● Understand ○ Apply Problem Solving

Interactive test

1 Complete the following table :

Number a	8	125	-27	......	$3\frac{3}{8}$	$-\frac{8}{125}$	......	......
$\sqrt[3]{a}$	......	......	......	-10	......	......	6	-4

2 Complete :

1. $\sqrt[3]{216} =$ ....
2. $\sqrt[3]{-343} =$ ....
3. $\sqrt[3]{0.001} =$ ....
4. $\sqrt[3]{-\frac{8}{27}} =$ ....
5. $\sqrt[3]{8} + \sqrt[3]{-8} =$ ....
6. $\sqrt[3]{27} - \sqrt[3]{64} =$ ....
7. $\sqrt[3]{27} - \sqrt[3]{-27} =$ ....
8. $\sqrt{9} + \sqrt[3]{-8} =$ ....
9. $-\sqrt[3]{-1} - \sqrt{1} =$ ....
10. $\frac{-\sqrt[3]{64}}{\sqrt{64}} =$ ....
11. $\sqrt[3]{a^3} =$ ....
12. $\sqrt[3]{-27\,a^6} =$ ....
13. $\sqrt[3]{\text{..........}} = 4$
14. $\sqrt{16} = \sqrt[3]{\text{..........}}$
15. $|\sqrt[3]{-125}| = \sqrt{\text{..........}}$
16. $\sqrt[3]{64 + \text{............}} = 5$

3 Choose the correct answer from those given :

1. $\sqrt[3]{(-8)^2} = \ldots\ldots\ldots$

(a) 2 (b) – 2 (c) 4 (d) – 4

2. $\sqrt[3]{\left(\frac{1}{8}\right)^2} = \ldots\ldots\ldots$

(a) $\frac{1}{2}$ (b) $\frac{1}{4}$ (c) $\frac{1}{8}$ (d) $\frac{1}{16}$

3. $\sqrt[3]{-64} + \sqrt{16} = \ldots\ldots\ldots$

(a) zero (b) 8 (c) – 8 (d) ± 8

4. $\sqrt{25} - \sqrt[3]{-125} = \ldots\ldots\ldots$

(a) 10 (b) zero (c) 5 (d) ± 5

5. $\sqrt{(-2)^2} + \sqrt[3]{(-2)^3} = \ldots\ldots\ldots$

(a) – 4 (b) 8 (c) 4 (d) zero

6. $\sqrt[3]{3\frac{3}{8}} + \sqrt{0.25} = \ldots\ldots\ldots$

(a) $\frac{3}{2}$ (b) $\frac{1}{2}$ (c) 2 (d) – 2

7. $\sqrt[3]{0.001 \times \frac{1}{8}} = \ldots\ldots\ldots$

(a) $\frac{1}{2}$ (b) 2 (c) $\frac{1}{20}$ (d) 20

8. $\sqrt[3]{1000} \times \sqrt[3]{-0.008} = \ldots\ldots\ldots$

(a) $\frac{1}{2}$ (b) 10 (c) 2 (d) – 2

9. $\sqrt[3]{-27} + \sqrt{12\frac{1}{4}} + \sqrt[3]{0.125} = \ldots\ldots\ldots$

(a) 1 (b) zero (c) – 1 (d) $\frac{11}{2}$

10. If $-\sqrt{25} = \sqrt[3]{y}$, then y = ………

(a) 5 (b) – 5 (c) 125 (d) – 125

11 If $x^3 = 64$, then $\sqrt{x} =$ ....

(a) 4 (b) -4 (c) 2 (d) -2

12 If $x^3 = 27$, then $x^2 =$ ....

(a) 3 (b) 6 (c) 9 (d) 81

13 $\sqrt[3]{x^6} = \sqrt{\text{..........}}$

(a) x^3 (b) x^2 (c) x (d) x^4

14 If $\frac{x}{3} = \frac{9}{x^2}$, then $x =$ ....

(a) 1 (b) 3 (c) 9 (d) 27

4 Find the value of x in each of the following :

1 $\sqrt[3]{x} = 5$ 2 $\sqrt[3]{x} = -\frac{1}{4}$ 3 $\sqrt[3]{x} = -\sqrt{4}$

4 $\sqrt[3]{x} - 3 = -1$ 5 $x^3 = -8$ 6 $x^3 = 64$

7 $x^3 + 5 = 32$ 8 $2x^3 = 54$ 9 $\frac{1}{5}x^3 = -200$

5 Find the S.S. of each of the following equations in $\mathbb{Q}$:

1 $x^3 + 27 = 0$ 2 $8x^3 + 7 = 8$ 3 $x^3 + 16 = \frac{3}{8}$

4 $2x^3 - 5 = x^3 + 3$ 5 $(x + 3)^3 = 343$ 6 $(3x + 1)^3 = -8$

7 $(2x + 1)^3 - 7 = 20$ 8 $(5x - 2)^3 + 10 = 18$

6 Find each of the following :

1 $\sqrt[3]{2\frac{1}{4} \div \frac{2}{3}}$ 2 $-\sqrt[3]{2^9 \times 3^6}$ 3 $\sqrt{\sqrt[3]{729}}$

4 $\sqrt[3]{\sqrt[3]{512}}$ 5 $\sqrt{27\sqrt[3]{27}}$

Applications

7 A cube of volume 27 cm³. Find the area of one face. « 9 cm² »

8 Find the total area of a cube whose volume is 216 cm³. « 216 cm² »

● Remember ● Understand ○ Apply ● Problem Solving

9 If the half of the cube of a number equals 32 , find this number. « 4 »

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10 Find the inner edge length of a cube vessel with capacity of one litre. « 10 cm. »

---

11 Find the diameter length of a sphere whose volume is $\frac{1372}{81}\pi$ cube unit. « $\frac{14}{3}$ length unit »

---

12 Find the length of the diameter of a sphere whose volume is 113.04 cm^3. ($\pi = 3.14$) « 6 cm. »

For excellent pupils

13 **Find the S.S. of each of the following equations in $\mathbb{Q}$:**

1. $(x^2+6)^3 = 1000$
2. $(x^3-14)^2 = 169$
3. $\sqrt[3]{(x-1)^2} = \sqrt[3]{25}$
4. $\sqrt[3]{(x-2)(x^2-4x+4)} = 3$

---

14 If $\sqrt[3]{\sqrt{x}+19} = 3$, find the value of $\sqrt[3]{x}$ « 4 »

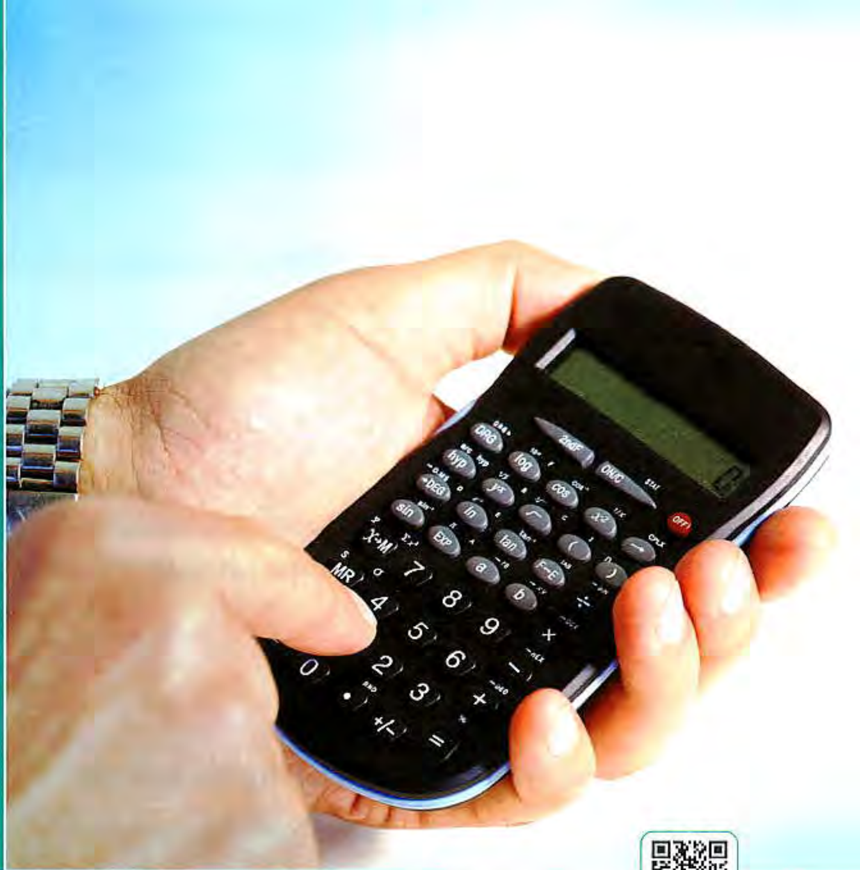
---

15 A man was asked about the age of his father and the age of each of his three sons.
His answer was as follows :
My age is half the age of my father. The age of my eldest son is the square root of the age of my father and the age of my middle son is the cube root of the age of my father and the age of my youngest daughter is the quotient of the age of my eldest son by the age of my middle son. Given that the age of my eldest son is twice the age of my middle son.
What is the age of each of his father and his three sons ? « 64 , 8 , 4 , 2 »

Exercise **2**

The set of irrational number $\mathbb{Q}'$

From the school book



● Remember ● Understand ● Apply ● Problem Solving

Interactive test

1 **In each of the following , show which of them is a rational number and which of them is an irrational number :**

1 -5	2 $2\frac{2}{3}$	3 2.06	4 2.3×10^5
5 $-\sqrt{36}$	6 $\sqrt[3]{36}$	7 $\sqrt{7}$	8 zero
9 $\lvert -5 \rvert$	10 $\sqrt[3]{-\frac{64}{81}}$	11 $\sqrt{\frac{25}{16}}$	12 $\sqrt{\frac{1}{3}}$
13 $\sqrt[3]{3\frac{3}{8}}$	14 $\sqrt[3]{0.343}$	15 $\frac{\pi}{2}$	16 $(-5)^{\text{zero}}$
17 $\frac{\text{zero}}{3}$	18 $\frac{\sqrt{9}}{\sqrt{4}}$	19 $\sqrt{9}+\sqrt{16}$	20 $\sqrt{4}-\sqrt{11}$

2 **Find an approximated value for each of the following numbers :**

1 $\sqrt{11}$ "to the nearest hundredth".

2 $\sqrt[3]{7}$ "to the nearest tenth".

3 $\sqrt[3]{-9}$ "to the nearest tenth".

3 **Find two consecutive integers for each of the following numbers to be included between them :**

1 $\sqrt{5}$ 2 $\sqrt{12}$ 3 $\sqrt[3]{10}$ 4 $\sqrt[3]{-20}$

4 **If x is an integer , find the value of x in each of the following cases :**

1. $x < \sqrt{2} < x + 1$ « 1 »
2. $x < \sqrt{80} < x + 1$ « 8 »
3. $x < \sqrt[3]{5} < x + 1$ « 1 »
4. $x < \sqrt[3]{50} < x + 1$ « 3 »
5. $x < \sqrt[3]{-100} < x + 1$ « – 5 »
6. $x < |-\sqrt{35}| < x + 1$ « 5 »

---

5 **Find an approximated value for each of the following numbers , then check your answer using the calculator :**

1. $\sqrt{20}$
2. $\sqrt[3]{17}$
3. $\sqrt{5} + 1$
4. $\sqrt[3]{9} - 1$

---

6 **Choose the correct answer from the given ones :**

1. The irrational number in the following numbers is …………

   (a) $\sqrt{\frac{1}{4}}$ (b) $\sqrt[3]{8}$ (c) $\sqrt{\frac{4}{9}}$ (d) $\sqrt{2}$

2. If $x = \sqrt{2}$, $y = 2$, then which of the following does not represent a rational number ?

   (a) $x^2 + y$ (b) $x + y^2$ (c) $\sqrt{x^2 y}$ (d) $\sqrt{2}\, x y$

3. The irrational number located between 2 and 3 is …………

   (a) $\sqrt{10}$ (b) $\sqrt{7}$ (c) 2.5 (d) $\sqrt{3}$

4. The irrational number located between –2 and –1 is …………

   (a) – 3 (b) $-1\frac{1}{2}$ (c) $-\sqrt{3}$ (d) $\sqrt{2}$

5. $\sqrt{10} \approx$ …………

   (a) 2.99 (b) 3.71 (c) 3 (d) – 3.2

6. The nearest integer to $\sqrt[3]{25}$ is …………

   (a) 5 (b) 3 (c) 2 (d) 12.5

7. If $n \in \mathbb{Z}_+$, $n < \sqrt{26} < n + 1$, then $n =$ …………

   (a) 25 (b) 5 (c) – 5 (d) 24

8. The side length of a square whose area is 6 cm^2 is …………

   (a) a natural number. (b) an integer.

   (c) a rational number. (d) an irrational number.

9 The area of a square whose side length is $\sqrt{3}$ cm. is .... cm^2.

(a) $4\sqrt{3}$ (b) 9 (c) 3 (d) 6

10 The square whose area is 10 cm^2, its side length is .... cm.

(a) 5 (b) -5 (c) $\sqrt{10}$ (d) $-\sqrt{10}$

11 The S.S. of the equation : $\left(x-\sqrt{5}\right)\left(x+\sqrt{3}\right)=0$ in $\grave{\mathbb{Q}}$ is ....

(a) $\{\sqrt{5}\}$ (b) $\{-\sqrt{3}\}$ (c) $\{-\sqrt{5},\sqrt{3}\}$ (d) $\{\sqrt{5},-\sqrt{3}\}$

7 Find the value of x in each of the following cases and determine whether $x \in \mathbb{Q}$ or $x \in \grave{\mathbb{Q}}$:

1 $5x^2 = 10$ « $\pm\sqrt{2}$ »

2 $4x^2 = 9$ « $\pm\frac{3}{2}$ »

3 $x^3 = 125$ « 5 »

4 $3x^3 = 27$ « $\sqrt[3]{9}$ »

5 $0.1x^2 = 10$ « ± 10 »

6 $0.001x^3 = -8$ « -20 »

7 $(x-1)^2 = 4$ « 3 or -1 »

8 $(x-5)^3 = 1$ « 6 »

8 Find in $\grave{\mathbb{Q}}$ the S.S. of each of the following equations :

1 $x^2 = 13$

2 $x^3 = 16$

3 $\frac{2}{5}x^2 = \frac{25}{2}$

4 $\frac{5}{4}x^3 = -2$

5 $125x^3 - 7 = 20$

6 $\frac{1}{4}x^2 + 2 = 66$

7 $(x^3+5)(x^2-3) = \text{zero}$

8 $\left(x+\sqrt{7}\right)\left(x^3-6\right) = \text{zero}$

9 Prove that :

1 $\sqrt{2}$ is included between 1.4 and 1.5

2 $\sqrt{11}$ is included between 3.31 and 3.32

3 $\sqrt[3]{2}$ is included between 1.2 and 1.3

4 $\sqrt[3]{15}$ is included between 2.4 and 2.5

5 $\sqrt[3]{-17}$ is included between -2.6 and -2.5

6 $\sqrt{3}+1$ is included between 2.7 and 2.8

10 **Determine the point that represents each of the following numbers on the number line :**

1. $\sqrt{3}$ 2. $-\sqrt{11}$ 3. $\sqrt{10}$ 4. $\sqrt{5}+1$ 5. $2-\sqrt{7}$

---

11 Draw the number line and label point A which represents $\sqrt{2}$

- Label point B which represents $1+\sqrt{2}$
- Label point C which represents $1-\sqrt{2}$

---

12 Draw the right-angled triangle ABC at B where AB = 1 cm. and BC = 3 cm. , then use the figure to determine the points that represent the following numbers on the number line :

1. $\sqrt{10}$ 2. $-\sqrt{10}$ 3. $2+\sqrt{10}$ 4. $3-\sqrt{10}$

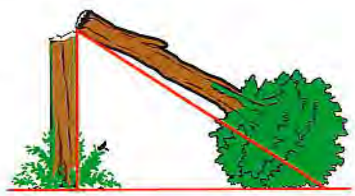
---

13 Calculate the side length and the diagonal length of a square whose area equals 10 cm^2.

«$\sqrt{10}$ cm. , $\sqrt{20}$ cm. »

Life Application

14 A tree is 3 metres long. Its upper part was broken because of the wind and it made an angle with the surface of the ground. If the length of the left part of the tree is 1 metre , find the distance between the base of the tree and the point of touching of its top with the ground.



«$\sqrt{3}$ metres »

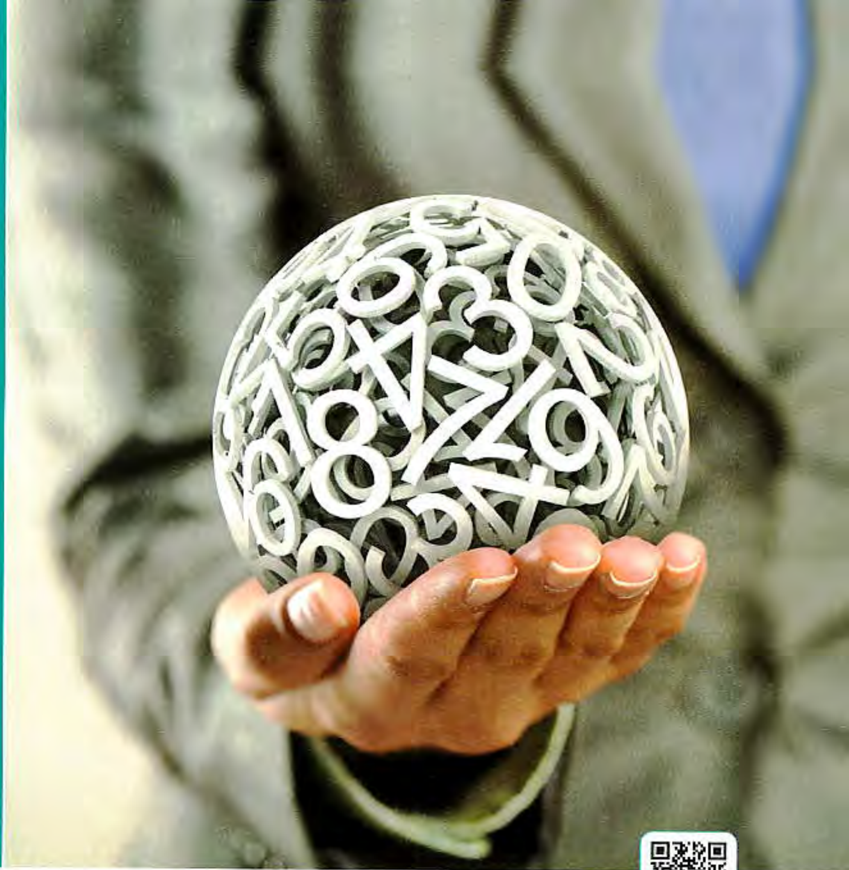
For excellent pupils

15 Without using the calculator , prove that $\sqrt{3}+\sqrt{2}$ is included between 3 and 4

Exercise 3

The set of real numbers $\mathbb{R}$ and ordering numbers in $\mathbb{R}$

From the school book



● Remember ● Understand ○ Apply ● Problem Solving

Interactive test

1 Complete the following table by placing (✓) in the suitable place as shown in the first case :

The number	Natural	Integer	Rational	Irrational	Real
-5	×	✓	✓	×	✓
$\sqrt{2}$					
$1\frac{1}{2}$					
$\sqrt[3]{9}$					
$\lvert -2 \rvert$					
$-\sqrt{4}$					
$\frac{5}{2}$					
0.3					
$\sqrt{-1}$					

2 If $x \in \mathbb{R}$, state whether x is positive or negative or anything else in each of the following cases :

1. $x > 0$
2. $x < 0$
3. $x > \lvert -4 \rvert$
4. $\lvert -5 \rvert < x < 7$
5. $-2 < x < 0$
6. $\lvert -1 \rvert < x < \lvert -7 \rvert$

3 **Put the suitable sign (> , < or =) :**

1. $\sqrt{5}$ 2
2. $\sqrt{7}$ 2.6
3. $\sqrt[3]{24}$ 3
4. $\sqrt[3]{-24}$ .... -2
5. $3-\sqrt{5}$ .... $\sqrt[3]{-1}$
6. $\sqrt[3]{8}$ .... $\sqrt{4}$
7. $1+\sqrt{3}$ .... $\sqrt{5}$
8. $\sqrt[3]{3}-1$ 0.2
9. $\sqrt{2}-1$ .... $1-\sqrt{2}$

4 **Choose the correct answer from those given :**

1. $\mathbb{R} =$ ....

(a) $\mathbb{Q} \cup \grave{\mathbb{Q}}$ (b) $\mathbb{Z}_+ \cup \mathbb{Z}_-$ (c) $\mathbb{R}_+ \cup \mathbb{R}_-$ (d) $\mathbb{N} \cup \mathbb{R}_-$

2. $\mathbb{Q} \cap \grave{\mathbb{Q}} =$ ....

(a) $\mathbb{Q}$ (b) $\grave{\mathbb{Q}}$ (c) $\mathbb{R}$ (d) $\varnothing$

3. $\mathbb{Q} \cup \grave{\mathbb{Q}} =$ ....

(a) $\varnothing$ (b) $\mathbb{R}$ (c) $\mathbb{Q}$ (d) $\grave{\mathbb{Q}}$

4. $\mathbb{R}_+ \cap \mathbb{R}_- =$ ....

(a) $\varnothing$ (b) $\mathbb{R}$ (c) $\mathbb{R}_+$ (d) $\mathbb{R}_-$

5. $\mathbb{R}_+ \cup \mathbb{R}_- =$ ....

(a) $\mathbb{R}$ (b) $\varnothing$ (c) $\mathbb{R}_+$ (d) $\mathbb{R}^*$

6. $\mathbb{R} - \grave{\mathbb{Q}} =$ ....

(a) $\mathbb{R}$ (b) $\varnothing$ (c) $\mathbb{Q}$ (d) $\{0\}$

7. $\mathbb{R} - \mathbb{Q} =$ ....

(a) $\grave{\mathbb{Q}}$ (b) $\mathbb{R}$ (c) $\varnothing$ (d) $\{0\}$

8. $\mathbb{R}_+ \cap \{-1, 0, 1\} =$ ....

(a) $\{0, 1\}$ (b) $\{1\}$ (c) $\{0\}$ (d) $\varnothing$

9. $\{x : x \in \mathbb{R}, x < 0\} =$ ....

(a) $\mathbb{R}_+$ (b) $\mathbb{R}_-$ (c) $\mathbb{R}^*$ (d) $\mathbb{R}$

10. If x is a negative real number , then which of the following numbers is positive ?

(a) x^2 (b) x^3 (c) $2x$ (d) $\frac{x}{2}$

11. If $\frac{1}{a}$ and $\frac{a}{\sqrt{5}}$ are two real numbers included between 0 and 1 , then a = ...

(a) -2 (b) 1 (c) $\sqrt{5}$ (d) 2

12. If $x \in \mathbb{R}_+$, $y \in \mathbb{R}_+$ and $x^2 > y^2$, then ....

(a) $x > y$ (b) $x < y$ (c) $x = y$ (d) $x \leq y$

13 $\sqrt{(2-\pi)^2}$ .... $(2-\pi)$ (where π is the ratio between the circumference of the circle and its diameter length)

(a) = (b) < (c) > (d) ≤

14 The S.S. of the equation : $x^2+1=0$ in $\mathbb{R}$ is ....

(a) $\{-1\}$ (b) $\{1, -1\}$ (c) $\{1\}$ (d) $\varnothing$

5 Arrange the following numbers ascendingly :

1 $\sqrt{8}$, $-\sqrt{3}$, $\sqrt{15}$, $\sqrt{5}$, $-\sqrt{7}$ and $-\sqrt{11}$

2 $\sqrt{27}$, $-\sqrt{45}$, $\sqrt{20}$, 0.6 and $\sqrt[3]{-1}$

6 Arrange the following numbers descendingly :

1 $\sqrt{62}$, 8 , $-\sqrt{50}$ and $\sqrt{70}$

2 $\sqrt{6}$, 9 , $-\sqrt{10}$, $-\sqrt{7}$, $-\sqrt{50}$ and $\sqrt{101}$

7 Write three positive irrational numbers less than 2

8 Write three negative irrational numbers greater than $-\sqrt{6}$

9 Write four irrational numbers included between 15 and 17

10 Prove that $\sqrt{3}$ is between 1.7 and 1.8 , then represent $\sqrt{3}$, 1.7 and 1.8 on the number line.

11 Solve the following equations to the nearest hundredth given $x \in \mathbb{R}$:

1 $x^2 - 6 = 0$

2 $\frac{3}{4}x^2 = 24$

3 $\frac{1}{2}x^2 - 5 = 0$

4 $5x^3 + 3 = 2$

5 $\frac{3}{4}x^2 + 2 = -11$

6 $\frac{2}{x^3} + 5 = 21$ $(x \neq 0)$

7 $(x^2-9)(x^3-5) = 0$

8 $(2x^3-5)(x^2+1) = 0$

Geometric Applications

12 Find the side length of a square whose area is 5 cm^2. Is the side length a rational number ? «$\sqrt{5}$ cm.»

13 Find the edge length of a cube whose volume is 1.728 cm^3. Is the edge length a rational number ? «$\frac{6}{5}$ cm.»

● Remember ● Understand ○ Apply Problem Solving

14 A cube whose total area is 13.5 cm^2. Find its edge length. Is the edge length a rational number ? «1.5 cm.»

15 A square is of side length 6 cm. Find its diagonal length. «$\sqrt{72}$ cm.»

16 A square is of area 32 cm^2. Find its side length and its diagonal length. «$\sqrt{32}$ cm. , 8 cm.»

17 An isosceles right-angled triangle , the length of one side of its right-angle = 5 cm. Find the length of its hypotenuse. «$\sqrt{50}$ cm.»

18 A rectangle with dimensions 5 cm. and 7 cm. Find the length of its diagonal. And if its area equals the area of a square , then find the side length of the square and its diagonal length. «$\sqrt{74}$ cm. , $\sqrt{35}$ cm. , $\sqrt{70}$ cm.»

For excellent pupils

19 Without using the calculator , prove that : $\sqrt[3]{3} > \sqrt{2}$

20 Two real numbers , the sum of their squares is 7 and the greater number is 2 Find the other number. «$\sqrt{3}$ or $-\sqrt{3}$»

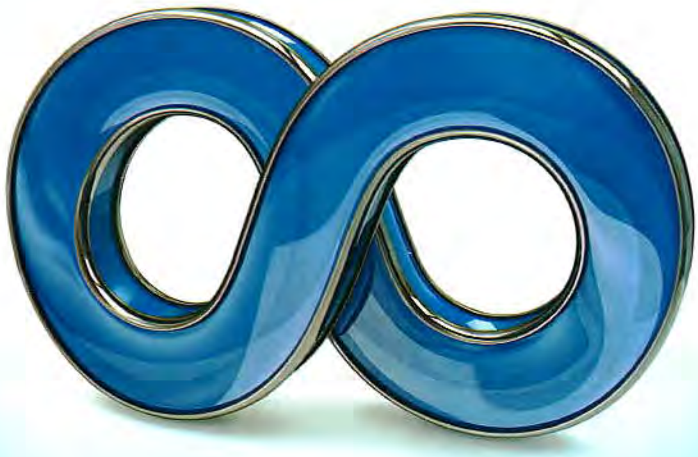
Wonders of numbers

Choose a number from 1 to 9 , multiply it by 3 , add 3 to the product , and multiply the result by 3 once again "use calculator" Find the sum of the digits of the product.

The answer is always 9.

Exercise **4**

Intervals



From the school book

● Remember ● Understand ○ Apply Problem Solving

Interactive test

1 **Complete the following table :**

The interval	Expression by description method	Its representation on the number line
1 $[-1 , 2]$	$\{x : -1 \leq x \leq 2 , x \in \mathbb{R}\}$	
2 $[1 , 3[$	....	....
3	$\{x : 0 < x \leq 3 , x \in \mathbb{R}\}$	....
4	....	
5 $]-\infty , 1]$	....	....
6	....	
7	$\{x : x < 4 , x \in \mathbb{R}\}$	....
8 $[-2 , \infty[$	....	....

2 **Choose the correct answer from the given ones :**

1 $\mathbb{R} =$ ....

(a) $\mathbb{R}_+ \cap \mathbb{R}_-$ (b) $\mathbb{R}_+ \cup \mathbb{R}_-$ (c) $]-\infty , \infty[$ (d) $\mathbb{Q} \cap \grave{\mathbb{Q}}$

2 $\mathbb{R}_+ =$ ....

(a) $]0 , \infty[$ (b) $]-\infty , 0[$ (c) $[0 , \infty[$ (d) $]-\infty , 0]$

3 $\mathbb{R}_- =$ ....

(a) $]0 , \infty[$ (b) $]-\infty , 0[$ (c) $[0 , \infty[$ (d) $]-\infty , 0]$

4 The set of non-negative real numbers = ...

(a) $]0 , \infty[$ (b) $]-\infty , 0[$ (c) $[0 , \infty[$ (d) $]-\infty , 0]$

5 The set of non-positive real numbers = ...

(a) $]0 , \infty[$ (b) $]-\infty , 0[$ (c) $[0 , \infty[$ (d) $]-\infty , 0]$

3 Complete each of the following using one of the symbols $\in$ or $\notin$:

1 3 .... $[3 , 5]$

2 -2 .... $]-2 , 1]$

3 0 .... $[-1 , 4[$

4 $|-3|$ .... $[2 , \infty[$

5 $\sqrt{9}$ .... $]-3 , \infty[$

6 $\sqrt[3]{-1}$ .... $]-\infty , 1[$

7 1.3×10^{-5} .... $\mathbb{R}_+$

8 $\sqrt{2}$ .... $[2 , 5]$

9 5 .... $]\sqrt{5} , \sqrt{23}[$

10 $\sqrt[3]{-125}$ .... $]-\sqrt{25} , \sqrt{25}]$

4 If $X = [2 , 5[$ and $Y = [-1 , 3[$, find using the number line :

1 $X \cup Y$ 2 $X \cap Y$ 3 $X - Y$

4 $Y - X$ 5 $\grave{X}$ 6 $\grave{Y}$

5 If $X =]-\infty , 3]$ and $Y = [-4 , \infty[$, find using the number line :

1 $X \cup Y$ 2 $X \cap Y$ 3 $X - Y$

4 $Y - X$ 5 $\grave{X}$ 6 $\grave{Y}$

6 If $X = [-1 , 4]$, $Y = [3 , \infty[$ and $Z = \{3 , 4\}$, find the following using the number line :

1 $X \cup Y$ 2 $X \cap Y$ 3 $X - Y$ 4 $X - Z$

5 $Y \cap Z$ 6 $Y - X$ 7 $\grave{X}$ 8 $\grave{Y}$

7 Find using the number line :

1 $[-1 , 4] \cap [2 , 5]$

2 $[-1 , 4] \cup [2 , 5]$

3 $]-2 , 3] \cap]0 , 1[$

4 $]-2 , 3] \cup]0 , 1[$

5 $[2 , 6] - [-1 , 3[$

6 $[-1 , 3[- [2 , 6]$

7 $[-3 , 0[\cup]0 , 2]$

8 $[-3 , 0] \cap]0 , 2]$

9 $[1 , 2] - [-2 , 4]$

10 $[-2 , 4] - [1 , 2]$

11 $[-1 , 4] \cap [5 , 7[$

12 $[-1 , 5] -]-1 , 5[$

8 **Find using the number line :**

1. $[-1, \infty[\cup [-3, 4]$
2. $[2, \infty[\cap]-2, 3[$
3. $]-\infty, 3] \cap [-4, \infty[$
4. $[2, \infty[\cup]-\infty, 3]$
5. $]-\infty, 3] - [-1, \infty[$
6. $]-\infty, -3] - [-3, 1]$
7. $]-\infty, 2] -]-\infty, 0]$
8. $]-\infty, 3[\cup]4, \infty[$

9 **Complete the following :**

1. $[3, 5] \cup \{3, 5\} =$ ....
2. $]3, 5[\cup \{3, 5\} =$ ....
3. $[3, 5] \cap \{3, 5\} =$ ....
4. $]3, 5[\cap \{3, 5\} =$ ....
5. $[3, 5] - \{3, 5\} =$ ....
6. $]3, 5[- \{3, 5\} =$ ....
7. $\{3, 5\} - [3, 5] =$ ....
8. $\{3, 5\} -]3, 5[=$ ....
9. $]3, 5[\cup \{3\} =$ ....
10. $[3, 5] - \{5\} =$ ....
11. $]2, 5[\cap \{-2, 3, 4\} =$ ....
12. $]-3, 5] \cup \{-2, 3, 4\} =$ ....

10 **Complete the following :**

1. $]1, 7[\cup]3, 5[=$ ....
2. $]-3, 2] - [0, 2] =$ ....
3. $[3, 4[\cup]3, 4] =$ ....
4. $]2, 5] \cap [2, 5[=$ ....
5. $[3, 5] - [3, 5[=$ ....
6. $[3, 7] - [4, 7] =$ ....
7. $[2, 7] -]2, 7[=$ ....
8. $[-2, 4] \cap [4, 6] =$ ....
9. If $X \cap [2, 7] = [3, 4[$, then $X =$ ....
10. If x is a positive real number , then $x > x^2$ when $x \in]$ .... , ... $[$

11 **Choose the correct answer from the given ones :**

1. $[-3, 4] - \{-3, 5\} =$ ....

   (a) $]-3, 4[$ (b) $]-3, 4]$ (c) $]-3, 5[$ (d) $[-3, 5[$

2. If $x \in [-3, \infty[$, then ....

   (a) $x < -3$ (b) $x \leq -3$ (c) $x > -3$ (d) $x \geq -3$

3 If X = $\{x : x \in \mathbb{R} , 2 < x \le 5\}$, then $[3 , 4]$ X

(a) $\in$ (b) $\notin$ (c) $\subset$ (d) $\not\subset$

4 $\{3\} \cap [3 , 6] =$ ....

(a) $\varnothing$ (b) $\{3\}$ (c) $]3 , 6]$ (d) $\{6\}$

5 $\{8 , 9 , 10\} -]8 , 10[=$ ....

(a) $\varnothing$ (b) $\{8 , 10\}$ (c) $\{9\}$ (d) $\mathbb{N}$

6 The sum of all real numbers in $[-75 , 75]$ is ....

(a) – 75 (b) 75 (c) 150 (d) zero

12 Complete the following :

1 $\mathbb{R} \cap [-3 , 3] =$ ....

2 $\mathbb{R} \cup]-1 , 4] =$ ....

3 $\mathbb{R} - [-1 , \infty[=$ ....

4 $\mathbb{R}_- - [-3 , 1] =$ ....

5 $]-2 , 5] - \mathbb{R}_+ =$ ....

6 $[-2 , 2] - \mathbb{R}_- =$ ....

7 $]-3 , 2] \cap \mathbb{Z}_+ =$ ....

8 $\mathbb{N} \cap [-5 , 2[=$ ....

9 $\mathbb{Z} \cap [-1 , 3[=$ ....

10 $\mathbb{R}_+ \cap [0 , 5] =$ ....

11 $\mathbb{R}_- \cap [-3 , 2] =$ ....

13 Choose from column (B) the suitable interval which represents the figure in column (A) :

(A)		(B)
1		$\mathbb{R} -]-3 , 1]$
2		$\mathbb{R} - [-3 , 1[$
3		$\mathbb{R} -]-3 , 1[$
4		$[-3 , 3[- \{1\}$
5		$[-3 , 1[$
		$]-3 , 1[$

Life Application

14 Two kinds of food , the first kind needs to be kept in a temperature between – 3 and 4 degrees and the other kind needs to be kept in a temperature between 2 and 10 degrees.

What is the temperature needed to keep the two kinds altogether at the same place ?

For excellent pupils

15 **Choose the correct answer from the given ones :**

1. **In the opposite figure :**

If x is a real number , then $x \in$ ....

(a) $\mathbb{R}_-$ (b) $\mathbb{R}_+$ (c) $]-\infty , -1]$ (d) $]-\infty , -1[$

2. If $x \in [-3 , 4]$, then $x^2 \in$ ....

(a) $[9 , 16]$ (b) $[0 , 9]$ (c) $[0 , 16]$ (d) $[-9 , 0]$

3. If $x \in [-5 , 4]$, then $x^2 \in$ ....

(a) $[0 , 16]$ (b) $[16 , 25]$ (c) $[0 , 25]$ (d) $[-5 , 0]$

4. If $x \in [1 , 16]$, then $-\sqrt{x} \in$ ....

(a) $[1 , 4]$ (b) $[-1 , 4]$ (c) $[-4 , -1]$ (d) $[-4 , 0]$

5. If $X \subset \mathbb{R}$, $[2 , 5] - X =]2 , 5[$, then $X =$ ....

(a) $[2 , 5]$ (b) $\{2 , 5\}$ (c) $[2 , 5[$ (d) $]2 , 5]$

6. If $X \subset \mathbb{R}$, $]4 , 7] \cup X = [1 , 7]$, then $X =$ ....

(a) $[1 , 3[$ (b) $[1 , 3]$ (c) $[1 , 4[$ (d) $[1 , 5]$

7. If $M \subset \mathbb{R}$, $M \cap [3 , 8[= [3 , 8[$, then $M =$ ....

(a) $]3 , 8[$ (b) $]3 , 8]$ (c) $[3 , 9]$ (d) $[3 , 7]$

8. If $]-\infty , k[\cap [-2 , 5] = [-2 , 3[$, then $k =$ ....

(a) -2 (b) 5 (c) 3 (d) zero

9. If $[-1 , x] \cap [y , 5] = [2 , 3]$, then $x^y =$ ....

(a) 8 (b) $\frac{1}{5}$ (c) 9 (d) -1

16 If $X \cap Y = [4 , 7]$, $X \cup Y = [3 , 7]$ and $X \subset Y$, **find :** X , Y and Y – X

Accumulative tests on Algebra and Statistics

Accumulative test 1 on lesson 1 – unit 1

1 Choose the correct answer from the given ones :

1. $\sqrt[3]{2\frac{10}{27}} = \text{..............}$

(a) $\frac{3}{4}$ (b) $\frac{10}{3}$ (c) $\frac{4}{3}$ (d) $\frac{20}{27}$

2. $\sqrt[3]{\text{..............}} + \sqrt[3]{27} = \sqrt{64}$

(a) 25 (b) -125 (c) 125 (d) 5

3. If $\sqrt[3]{x} = \frac{1}{4}$, then $x = \text{..............}$

(a) $\frac{1}{2}$ (b) $\frac{1}{16}$ (c) $\frac{1}{64}$ (d) $\frac{1}{12}$

4. $\sqrt[3]{x^6} = \sqrt{\text{..............}}$

(a) x (b) x^2 (c) x^3 (d) x^4

2 Complete the following :

1. $\sqrt[3]{\text{..............}} = -\sqrt{4}$
2. $\sqrt[3]{125} - \sqrt{25} = \text{..............}$
3. If $\sqrt[3]{x} = 3$, then $\sqrt{x-2} = \text{..............}$
4. The cube whose volume is 8 cm.^{3} , then its edge length = ... cm.

3 Find the S.S. of each of the following equations in $\mathbb{Q}$:

1. $x^3 + 1 = \text{zero}$
2. $8x^3 + 7 = 8$

Accumulative test 2 till lesson 2 – unit 1

1 Choose the correct answer from the given ones :

1 $\sqrt{6} \in$ ....

(a) $\mathbb{N}$ (b) $\mathbb{Q}$ (c) $\grave{\mathbb{Q}}$ (d) $\mathbb{Z}$

2 The irrational number located between 2 and 3 is ....

(a) $\sqrt{7}$ (b) $\sqrt{10}$ (c) 2.5 (d) $\sqrt{3}$

3 The nearest integer to $\sqrt[3]{-28}$ is ....

(a) -4 (b) -30 (c) -3 (d) 3

4 If $x=\sqrt{2}$, $y=2$, then which of the following does not represent a rational number ?

(a) x^2+y (b) $x+y^2$ (c) $\sqrt{x^2 y}$ (d) $\sqrt{2}\,x\,y$

---

2 Complete the following :

1 $\sqrt{4}-\sqrt[3]{-8}=$ ....

2 If $x<\sqrt{7}<x+1$, $x \in \mathbb{Z}$, then $x=$ ....

3 If the volume of a cube is 125 cm^3 , then the area of one of its faces is ....

4 The sum of the two square roots of $\frac{25}{16}$ equal ....

---

3 [a] Prove that : $\sqrt{5}$ is included between 2.2 and 2.3

[b] Without using the calculator , prove that : $\sqrt[3]{15}$ is included between 2.4 and 2.5

Accumulative test 3 till lesson 3 – unit 1

1 Choose the correct answer from the given ones :

1. $\mathbb{R}_+ \cup \mathbb{R}_- = \dots\dots\dots$

(a) $\mathbb{R}_+$ (b) $\mathbb{R}_-$ (c) $\mathbb{R}^*$ (d) $\mathbb{R}$

2. The irrational number located between 4 and 5 is $\dots\dots\dots$

(a) $\sqrt{8}$ (b) $4\sqrt{2}$ (c) $3\sqrt{2}$ (d) $\sqrt{10}$

3. $\sqrt[3]{9} \dots\dots\dots \sqrt{4}$

(a) $>$ (b) $<$ (c) $=$ (d) $\leq$

4. Which of the following rational numbers is located between $\frac{1}{5}$ and $\frac{2}{5}$?

(a) $\frac{2}{10}$ (b) $\frac{1}{10}$ (c) 0.3 (d) -0.3

5. If $\frac{1}{a}$, $\frac{a}{\sqrt{5}}$ are two real numbers included between zero and 1 , then a can equal $\dots\dots\dots$

(a) -2 (b) 1 (c) $\sqrt{5}$ (d) 2

---

2 Complete the following :

1. $\mathbb{Q} \cap \grave{\mathbb{Q}} = \dots\dots\dots$

2. The S.S. of $x^2 + 4 =$ zero in $\mathbb{R}$ is $\dots\dots\dots$

3. $\sqrt{4} - \sqrt[3]{-8} = \dots\dots\dots$

4. $\mathbb{R}^- \cap \mathbb{R}^+ = \dots\dots\dots$

5. The S.S. of $x^3 - 8 =$ zero in $\mathbb{R}$ is $\dots\dots\dots$

Accumulative test 4 till lesson 4 – unit 1

1 Choose the correct answer from the given ones :

1 {The multiplicative identity element , 3} .... [0 , 3]

(a) $\in$ (b) $\notin$ (c) $\subset$ (d) $\not\subset$

2 $\mathbb{R}$ = ...

(a) $\mathbb{R}_+ \cup \mathbb{R}_-$ (b) $]-\infty , \infty[$ (c) $]-\infty , 0]$ (d) $[0 , \infty[$

3 If $\sqrt{4} - \sqrt[3]{x} = 5$, then x = ...

(a) 125 (b) 27 (c) – 27 (d) 3

4 If x is a negative number , then which of the following numbers is positive ?

(a) x^3 (b) $2x$ (c) x^2 (d) $\frac{x}{2}$

2 Complete the following :

1 $[3 , 5] -]3 , 5[$ = ...

2 $]1 , \infty[\cup]-\infty , 1[$ = ...

3 The sum of the real numbers in the interval $]-4 , 4]$ equals ....

4 $\mathbb{Q} \cup \acute{\mathbb{Q}}$ = ...

3 If X = [2 , 5] , Y = [0 , 3]

1 Write X using the description method.

2 Represent X , Y on the number line.

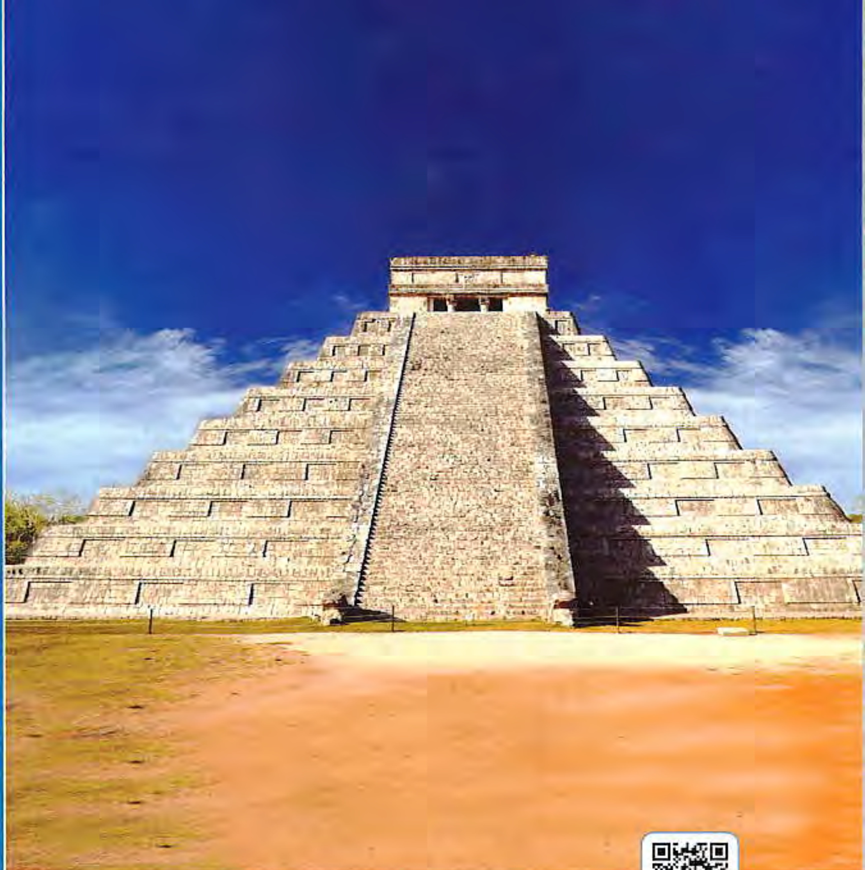
3 Find : X – Y as an interval by using the number line. Is $\sqrt{29} \in$ X – Y ?

4 If X = [– 1 , 4] , Y = [3 , ∞[

, find using the number line each of : X ∪ Y , X ∩ Ỳ , Y – X

Exercise 1

Medians of triangle



📖 From the school book

● Remember ● Understand ○ Apply Problem Solving

Interactive test

1 Complete the following :

1. In Δ ABC , if D is the midpoint of $\overline{BC}$, then $\overline{AD}$ is called ....
2. The number of medians of the triangle is ....
3. The medians of the triangle intersect at ....
4. The point of concurrence of the medians of the triangle divides each median in the ratio .... : .... from its base.
5. The point of concurrence of the medians of the triangle divides each median in the ratio .... : .... from the vertex.
6. The point of intersection of the medians of the triangle divides each of them in the ratio 2 : .... from the base.
7. The point of intersection of medians of the triangle divides each of them in the ratio .... : 8 from the vertex.

2 Choose the correct answer from those given :

1. The number of medians of the obtuse-angled triangle is ....

   (a) zero (b) 1 (c) 2 (d) 3

2. If $\overline{YD}$ is a median in Δ XYZ , M is the point of intersection of medians , then MD = ... YM

   (a) $\frac{1}{2}$ (b) $\frac{1}{3}$ (c) $\frac{2}{3}$ (d) $\frac{3}{2}$

3. If M is the point of intersection of medians of Δ ABC , $\overline{BD}$ is a median , then BD : MD = ...

   (a) 2 : 3 (b) 1 : 3 (c) 3 : 2 (d) 3 : 1

4 If $\overline{AD}$ is a median in ΔABC , M is the point of intersection of medians , then AD = ... AM

(a) $\frac{1}{3}$ (b) $\frac{1}{2}$ (c) $\frac{2}{3}$ (d) $\frac{3}{2}$

5 If $\overline{AD}$ is a median in ΔABC of length 9 cm. , M is the point of intersection of medians , then DM = ... cm.

(a) 3 (b) 4.5 (c) 6 (d) 9

6 If M is the point of intersection of the medians of ΔABC , $\overline{AD}$ is a median of length 6 cm. , then AM = ... cm.

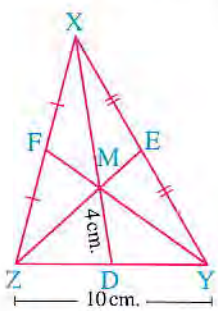
(a) 1 (b) 2 (c) 3 (d) 4

7 If M is the point of intersection of the medians of ΔABC , D is the midpoint of $\overline{BC}$, then AD = ...

(a) 2 AM (b) $\frac{2}{3}$ MD (c) $\frac{3}{2}$ AM (d) 4 MD

3 **Using data given for each of the following figures , find the required below each figure :**

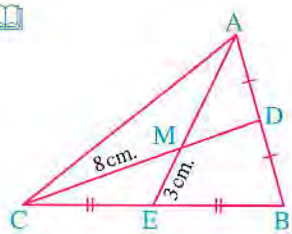
1



XM = ... cm. and

YD = ... cm.

2



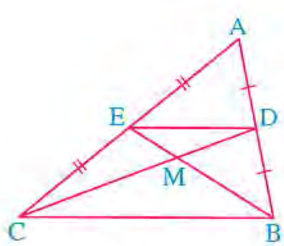
MA = ... cm. ,

MD = ... cm. ,

ME = ... AE

and MC = ... CD

3

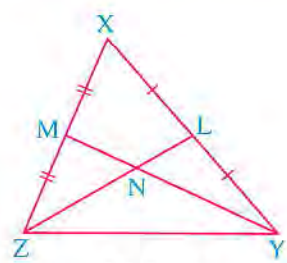


If BC = 12 cm. , BE = 9 cm. and MC = 8 cm. , then DE = ... cm. ,

ME = ... cm. and

MD = ... cm.

4



If LZ = 15 cm. , YM = 18 cm. and XY = 20 cm. ,

then NL = ... cm. ,

NY = ... cm. and the perimeter of

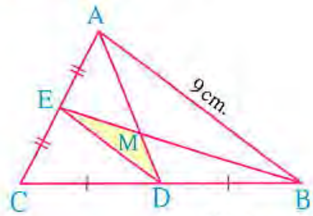
ΔNLY = ... cm.

4 **In the opposite figure :**

ABC is a triangle in which D is the midpoint of $\overline{BC}$, E is the midpoint of $\overline{AC}$ and $\overline{AD} \cap \overline{BE} = \{M\}$

If AD = 6 cm. and AB = BE = 9 cm.

Calculate : The perimeter of Δ MDE

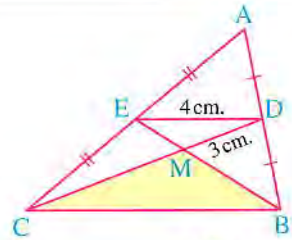


« 9.5 cm. »

5 **In the opposite figure :**

If D is the midpoint of $\overline{AB}$, E is the midpoint of $\overline{AC}$ and $\overline{BE} \cap \overline{DC} = \{M\}$, DE = 4 cm. , DM = 3 cm. and BE = 6 cm.

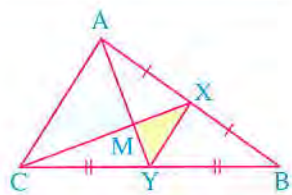
Find : The perimeter of Δ BMC



« 18 cm. »

6 **In the opposite figure :**

ABC is a triangle , X is the midpoint of $\overline{AB}$, Y is the midpoint of $\overline{BC}$, XY = 5 cm. and $\overline{XC} \cap \overline{AY} = \{M\}$ where CM = 8 cm. , YM = 3 cm. **Find :**



1 The perimeter of Δ MXY

2 The perimeter of Δ MAC

« 12 cm. , 24 cm. »

7 In Δ ABC , BC = 8 cm. , F and E are the midpoints of $\overline{AB}$ and $\overline{AC}$ respectively and $\overline{BE} \cap \overline{CF} = \{M\}$ If BM = 4 cm. and CM = 6 cm. **Find :** The perimeter of Δ MFE « 9 cm. »

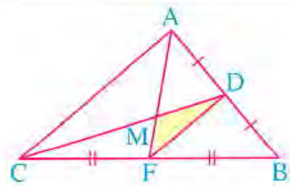
8 **In the opposite figure :**

$\overline{AF}$ and $\overline{CD}$ are two medians in Δ ABC ,

$\overline{AF} \cap \overline{CD} = \{M\}$

If the perimeter of Δ AMC = 36 cm.

Find : The perimeter of Δ MFD

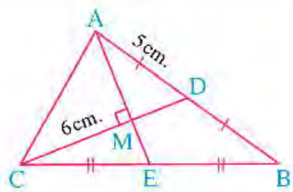


« 18 cm. »

9 **In the opposite figure :**

M is the point of concurrence of the medians of Δ ABC , $\overline{AM} \perp \overline{CD}$, MC = 6 cm. , AD = 5 cm.

Find : The length of $\overline{ME}$

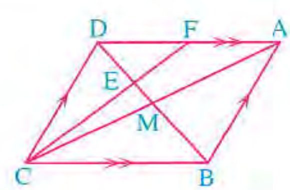


« 2 cm. »

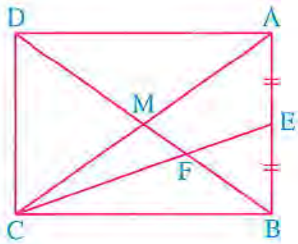
10 **In the opposite figure :**

ABCD is a parallelogram, its diagonals intersect at M , E $\in$ $\overline{DM}$ where DE = 2 EM , draw $\overrightarrow{CE}$ to cut $\overline{AD}$ at F

Prove that : AF = FD



11 **In the opposite figure :**



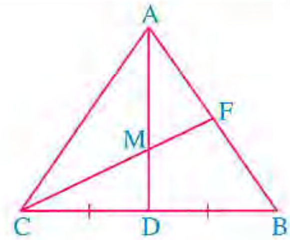
ABCD is a rectangle , its diagonals intersect at M ,

E is the midpoint of $\overline{AB}$, $\overline{CE} \cap \overline{BD} = \{F\}$

1 **Prove that :** F is the intersection point of the medians of the triangle ABC

2 If BF = 4 cm. , **find :** the length of $\overline{AM}$ « 6 cm. »

12 **In the opposite figure :**



ABC is a triangle in which D is the midpoint of $\overline{BC}$,

AB = AC , M $\in \overline{AD}$ where AM = $\frac{2}{3}$ AD and

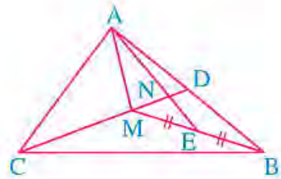
$\overrightarrow{CM} \cap \overline{AB} = \{F\}$

Prove that : BF = $\frac{1}{2}$ AC

13 ABC is a triangle where point D is the midpoint of $\overline{BC}$ and point M $\in \overline{AD}$, AM = 2 MD

Draw $\overrightarrow{CM}$ to intersect $\overline{AB}$ at point E If EC = 12 cm. , **then find :** the length of $\overline{EM}$ « 4 cm. »

14 **In the opposite figure :**



M $\in \overline{CD}$, M is the point of concurrence of the medians

of Δ ABC , N $\in \overline{DM}$ where ND = $(x - 1)$ cm.

, MN = $(x + 3)$ cm. , $\overrightarrow{AN}$ is drawn to intersect $\overline{BM}$ at E

which is the midpoint of $\overline{BM}$

Find : The length of $\overline{MC}$ « 24 cm. »

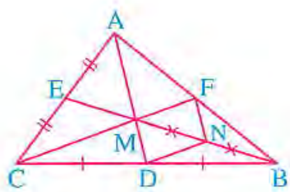
15 ABCD is a parallelogram whose diagonals intersect at M , E is the midpoint of $\overline{BC}$,

$\overline{DE}$ intersects $\overline{AC}$ at F

Prove that : 1 $\overrightarrow{BF}$ bisects $\overline{CD}$ 2 CF = $\frac{1}{3}$ AC

For excellent pupils

16 **In the opposite figure :**



$\overline{AD}$ and $\overline{BE}$ are medians in the triangle ABC intersecting at M ,

$\overrightarrow{CM} \cap \overline{AB} = \{F\}$, if N is the midpoint of $\overline{MB}$

Prove that : The figure FNDM is a parallelogram.

17 **In the opposite figure :**

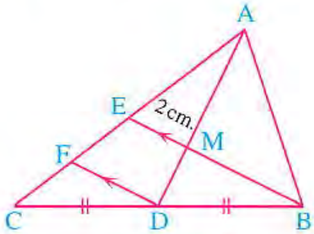
ABC is a triangle in which D is the midpoint of $\overline{BC}$

, $M \in \overline{AD}$ where $AM = 2\ MD$

, $\overrightarrow{BM} \cap \overline{AC} = \{E\}$

, $ME = 2$ cm. , draw $\overrightarrow{DF} \parallel \overline{BE}$ and cut $\overline{AC}$ at F

Find : The length of $\overline{DF}$



« 3 cm. »

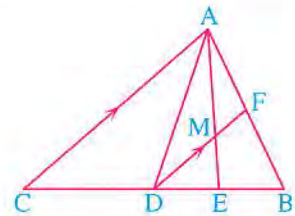
18 **In the opposite figure :**

ABC is a triangle in which D is the midpoint of $\overline{BC}$

and E is the midpoint of $\overline{BD}$, draw $\overrightarrow{DF} \parallel \overline{AC}$

and cut $\overline{AE}$ at M and $\overline{AB}$ at F

Prove that : $DM = \frac{1}{3} AC$



19 ABC is a triangle , D is the midpoint of $\overline{AB}$ and E is the midpoint of $\overline{AC}$

If $\overline{CD} \cap \overline{BE} = \{M\}$ Draw $\overrightarrow{AM}$ to intersect $\overline{BC}$ at F

Prove that : The figure DBFE is a parallelogram.

Exercise 2

Medians of triangle "Follow"

From the school book

Remember · Understand · Apply · Problem Solving

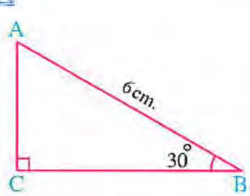
Interactive test

1 **Complete the following :**

1. The number of medians in the right-angled triangle is ....
2. The length of the median from the vertex of the right angle in the right-angled triangle equals ....
3. If the length of the median drawn from a vertex of a triangle equals half the length of the opposite side to this vertex , then the angle at this vertex is ....
4. The length of the side opposite to the angle of measure 30° in the right-angled triangle equals ....
5. The length of the hypotenuse in thirty and sixty triangle equals .... the length of the side opposite to the angle whose measure is 30°
6. The length of the hypotenuse in the right-angled triangle equals .... the length of the median drawn from the vertex of the right angle.

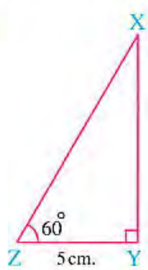
2 **Using data given for each of the following figures , find the required below each figure :**

1.



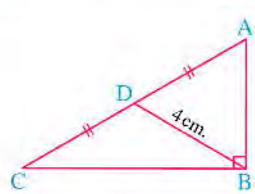
AC = ... cm.

2.



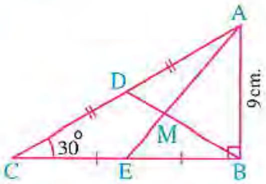
XZ = ... cm.

3.



AC = ... cm.

4



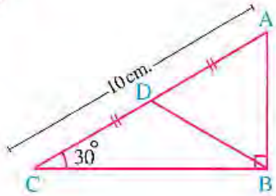
AC = ... cm. ,

BD = ... cm. ,

MD = ... BD

and MD = ... cm.

5



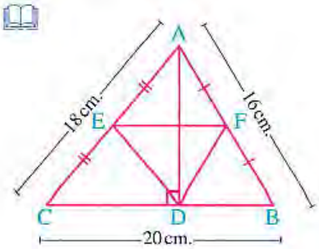
BD = ... cm. ,

AB = ... cm.

and the perimeter of

Δ ABD = ... cm.

6



DF = ... cm. ,

DE = ... cm. ,

FE = ... cm.

and the perimeter of

Δ DEF = ... cm.

3 Choose the correct answer from those given :

1 In the right-angled triangle , the ratio between the length of the median drawn from the vertex of the right angle and the length of the hypotenuse is ....

(a) 2 : 1 (b) 1 : 2 (c) 2 : 3 (d) 3 : 2

2 In the thirty-sixty triangle , the ratio between the length of the hypotenuse and the length of the side opposite to the angle of measure 30° is ....

(a) 1 : 2 (b) 2 : 1 (c) 1 : 1 (d) 1 : 3

3 In the thirty-sixty triangle , the ratio between the length of the median drawn from the vertex of the right angle and the length of the side opposite to the angle of measure 30° is ....

(a) 1 : 2 (b) 2 : 1 (c) 1 : 1 (d) 2 : 3

4 ABC is a right-angled triangle at B , D is the midpoint of $\overline{AC}$, then BD = ...

(a) $\frac{1}{2}$ AC (b) AC (c) $\frac{1}{2}$ BC (d) AB

5 ABC is a triangle in which m (∠ A) = 90° , AC = $\frac{1}{2}$ BC , then m (∠ C) = ...

(a) 30° (b) 60° (c) 90° (d) 120°

6 In Δ ABC , m (∠ B) = 90° , if 2 AB – AC = 0 , then m (∠ C) = ...

(a) 30° (b) 60° (c) 90° (d) 120°

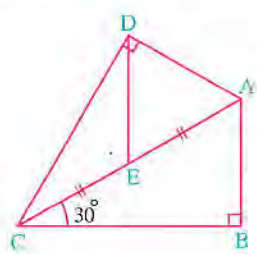
4 In the opposite figure :

m (∠ ABC) = m (∠ ADC) = 90° ,

m (∠ ACB) = 30° and

E is the midpoint of $\overline{AC}$

Prove that : AB = DE



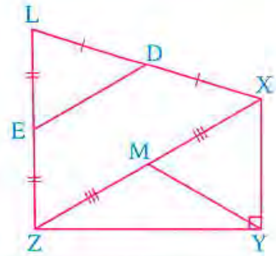
5 **In the opposite figure :**

m (∠ XYZ) = 90° , D is the midpoint of $\overline{XL}$,

E is the midpoint of $\overline{ZL}$ and

M is the midpoint of $\overline{XZ}$

Prove that : DE = YM



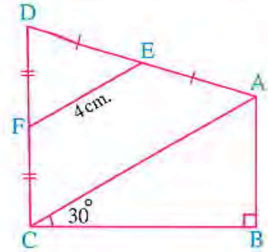
6 **In the opposite figure :**

ABCD is a quadrilateral in which m (∠ B) = 90° ,

E is the midpoint of $\overline{AD}$, F is the midpoint of $\overline{CD}$,

m (∠ ACB) = 30° and EF = 4 cm.

Find by proof : The length of $\overline{AB}$ « 4 cm. »



7 **In the opposite figure :**

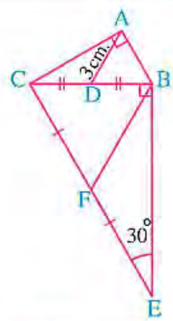
m (∠ BAC) = m (∠ CBE) = 90°

, m (∠ BEC) = 30°

, D and F are the midpoints

of $\overline{BC}$ and $\overline{CE}$ respectively and AD = 3 cm.

Find : The length of $\overline{BF}$ « 6 cm. »



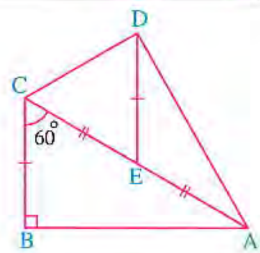
8 **In the opposite figure :**

ABC is a right-angled triangle at B , m (∠ ACB) = 60° ,

E is the midpoint of $\overline{AC}$ and

DE = BC

Prove that : m (∠ ADC) = 90°



9 **In the opposite figure :**

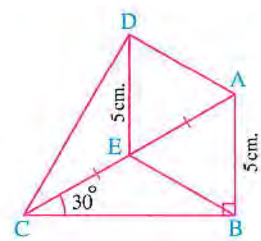
ABC is a right-angled triangle at B ,

m (∠ ACB) = 30° , AB = 5 cm. and

E is the midpoint of $\overline{AC}$

If DE = 5 cm. ,

prove that : m (∠ ADC) = 90°



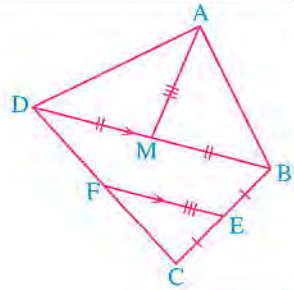
10 **In the opposite figure :**

ABD is a triangle , M is the midpoint of $\overline{BD}$,

E is the midpoint of $\overline{BC}$,

F ∈ $\overline{CD}$, $\overline{EF}$ // $\overline{BD}$ and AM = EF

Prove that : m (∠ BAD) = 90°



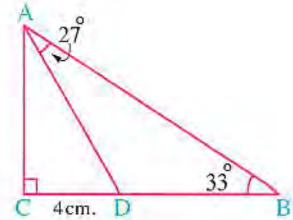
11 **In the opposite figure :**

ABC is a triangle in which m (∠ B) = 33°

, m (∠ C) = 90° , D ∈ $\overline{BC}$ where CD = 4 cm.

, m (∠ BAD) = 27°

Find : The length of $\overline{AD}$ « 8 cm. »

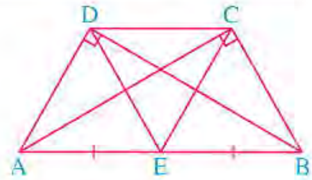


12 **In the opposite figure :**

ADB is a right-angled triangle at D ,

ACB is a right-angled triangle at C and E is the midpoint of $\overline{AB}$

Prove that : Δ CED is an isosceles triangle.



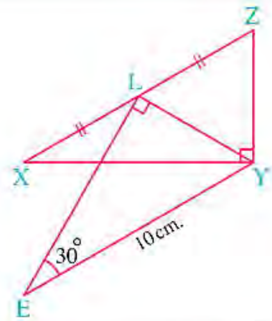
13 **In the opposite figure :**

m (∠ YLE) = 90° , m (∠ E) = 30° , YE = 10 cm. ,

m (∠ XYZ) = 90° and

L is the midpoint of $\overline{XZ}$

Find by proof : The length of $\overline{XZ}$ « 10 cm. »

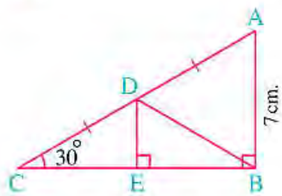


14 **In the opposite figure :**

ABC is a right-angled triangle at B , D is the midpoint

of $\overline{AC}$, $\overline{DE}$ ⊥ $\overline{BC}$, AB = 7 cm. and m (∠ C) = 30°

Find the length of each of : $\overline{BD}$ and $\overline{DE}$



« 7 cm. , 3.5 cm. »

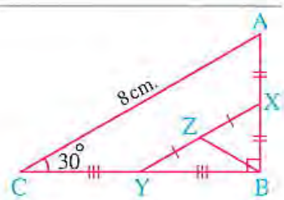
15 **In the opposite figure :**

ABC is a triangle in which m (∠ ABC) = 90° , m (∠ C) = 30° ,

X , Y and Z are the midpoints of $\overline{AB}$, $\overline{BC}$ and $\overline{XY}$

respectively and AC = 8 cm.

Find the length of each of : $\overline{AB}$, $\overline{XY}$ and $\overline{BZ}$



« 4 cm. , 4 cm. , 2 cm. »

16 **In the opposite figure :**

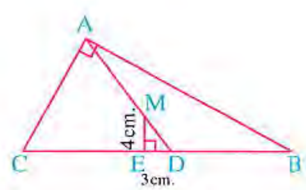
ABC is a right-angled triangle at A

, M is the point of concurrence of its medians

, E ∈ $\overline{DC}$ where $\overline{ME}$ ⊥ $\overline{DC}$, DE = 3 cm.

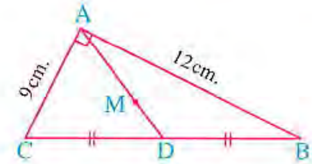
and ME = 4 cm.

Find : The length of $\overline{BC}$



« 30 cm. »

17 **In the opposite figure :**



m ($\angle$ BAC) = 90° , AB = 12 cm. , AC = 9 cm.

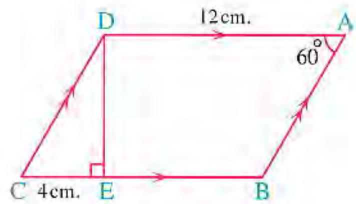
$\overline{AD}$ is a median of Δ ABC and M is the point of concurrence of the medians of Δ ABC

Find : The length of $\overline{AM}$

« 5 cm. »

---

18 **In the opposite figure :**



ABCD is a parallelogram in which

m ($\angle$ A) = 60° , $\overline{DE} \perp \overline{BC}$

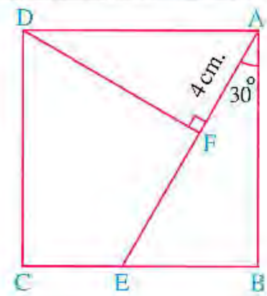
, AD = 12 cm. and EC = 4 cm.

Find : The perimeter of the parallelogram ABCD

« 40 cm. »

---

19 **In the opposite figure :**



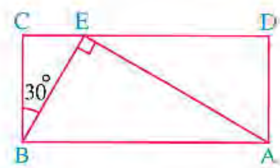
ABCD is a square , E $\in \overline{BC}$ where m ($\angle$ BAE) = 30° and $\overline{DF} \perp \overline{AE}$ If AF = 4 cm.

Calculate : The area of the square ABCD

« 64 cm^2. »

---

20 **In the opposite figure :**



ABCD is a rectangle , E $\in \overline{DC}$

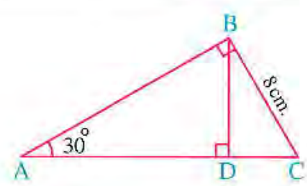
where m ($\angle$ CBE) = 30°

and m ($\angle$ AEB) = 90°

Prove that : CE = $\frac{1}{4}$ AB

---

21 **In the opposite figure :**



ABC is a right-angled triangle at B ,

m ($\angle$ A) = 30° ,

D $\in \overline{AC}$ such that $\overline{BD} \perp \overline{AC}$

If BC = 8 cm.

Find : The length of $\overline{AD}$

« 12 cm. »

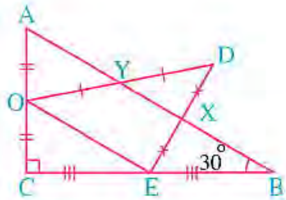
22 **In the opposite figure :**

ABC is a right-angled triangle at C in which m (∠ B) = 30°

, E , O , X , Y are the midpoints of $\overline{BC}$, $\overline{AC}$

, $\overline{DE}$, $\overline{DO}$ respectively

Prove that : $XY = \frac{1}{2} AC$



---

23 ABC is a triangle in which AB = AC and $\overrightarrow{AD}$ is drawn to be perpendicular to $\overline{BC}$ where $\overrightarrow{AD} \cap \overline{BC} = \{D\}$ If E and F are the two midpoints of $\overline{AB}$ and $\overline{AC}$ respectively,

prove that : DE + DF = AB

---

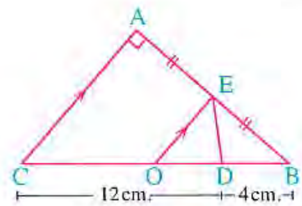
24 **In the opposite figure :**

ABC is a right-angled triangle at A

, E is the midpoint of $\overline{AB}$, $O \in \overline{BC}$

where $\overline{EO} \,//\, \overline{AC}$, $D \in \overline{BO}$ where BD = 4 cm. , DC = 12 cm.

Find : The length of $\overline{DE}$



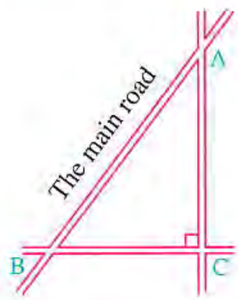
« 4 cm. »

Life Application

25 The opposite figure is a sketch for three towns A , B and C such that the distance between the towns A and C is 40 km. and the distance between the towns B and C is 30 km.

If we want to build a service station lying on the main road at the half-way between the towns A and B , also we want to build a road linking this station to the town C

, then how long will this road be ?



« 25 km. »

For excellent pupils

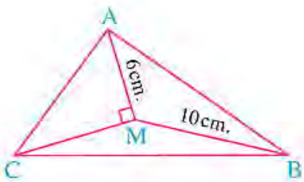
26 **In the opposite figure :**

M is the point of concurrence of the medians of Δ ABC

, AM = 6 cm. , BM = 10 cm.

, m (∠ AMC) = 90°

Find by proof : 1 The length of $\overline{AC}$ 2 The length of $\overline{MC}$



« 10 cm. , 8 cm. »

---

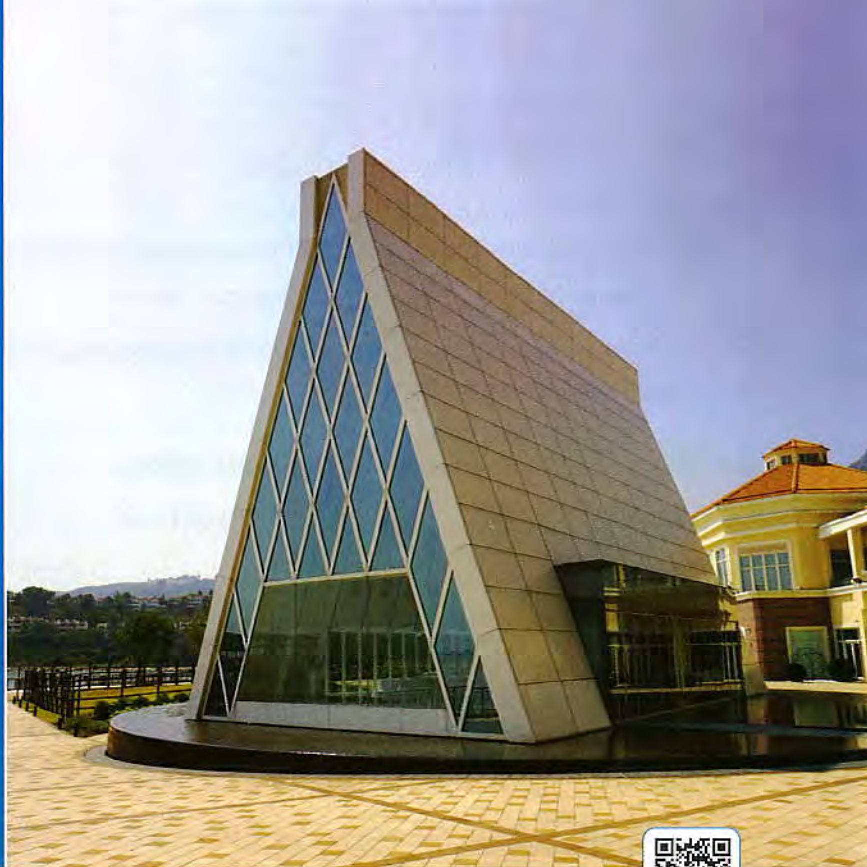
27 ABCD is a parallelogram , X is an interior point in it such that $\overrightarrow{DX}$ bisects ∠ ADC , $\overrightarrow{CX}$ bisects ∠ DCB , if the point Y is the midpoint of $\overline{DC}$

, **prove that :** XY = YC

Exercise 3

The isosceles triangle

From the school book

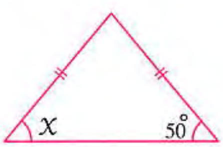


● Remember ● Understand ● Apply ● Problem Solving

Interactive test

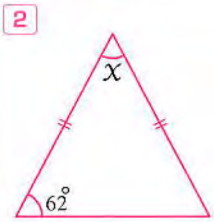
1 In each of the following , find the value of the symbol used for the measure of the angle :

1 (From the school book)



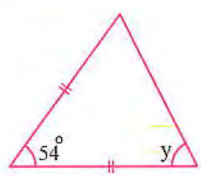
x = ...°

2



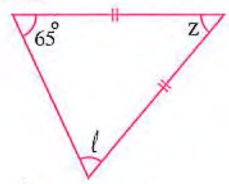
x = ...°

3 (From the school book)



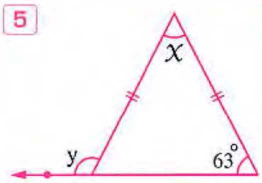
y = ...°

4 (From the school book)



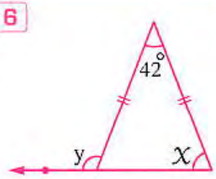
ℓ = ...° ,
z = ...°

5



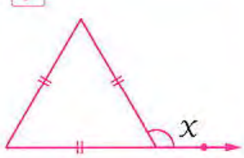
x = ...° ,
y = ...°

6



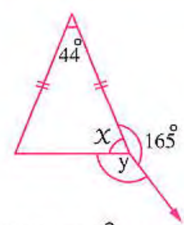
x = ...° ,
y = ...°

7



x = ...°

8



x = ...° ,
y = ...°

2 Complete the following :

- 1 The base angles of the isosceles triangle are ....
- 2 The measure of each angle in the equilateral triangle equals ....°
- 3 In Δ DEF , if DE = DF , then m (∠ E) = m (∠ ....)
- 4 In the isosceles triangle , if the measure of one of the two base angles is 65° , then the measure of its vertex angle equals ....°

5 In the isosceles triangle , if the measure of the vertex angle equals 40° , then the measure of one of the two base angles equals ....°

6 An isosceles triangle , the measure of its vertex angle is 80° , if the measure of one of its base angles is $(X + 30°)$, then $X =$ ....

3 **Choose the correct answer from those given :**

1 In Δ XYZ , if XY = YZ = XZ , then m (∠ X) = ...

(a) 30° (b) 60° (c) 90° (d) 180°

2 The measure of the exterior angle of the equilateral triangle equals ....

(a) 60° (b) 90° (c) 120° (d) 180°

3 LMN is a triangle in which LM = MN , m (∠ M) = 70° , m (∠ N) = ...

(a) 20° (b) 35° (c) 55° (d) 70°

4 In Δ ABC , AB = AC , m (∠ C) = 65° , then m (∠ A) = ...

(a) 30° (b) 50° (c) 55° (d) 130°

5 In Δ XYZ , ZY = ZX , m (∠ Z) = 120° , then m (∠ X) = ...

(a) 30° (b) 60° (c) 90° (d) 120°

6 If Δ ABC is right-angled at A and AB = AC , then m (∠ B) = ...

(a) 30° (b) 45° (c) 60° (d) 90°

7 XYZ is an isosceles triangle in which , m (∠ Y) = 100° , then m (∠ Z) = ...

(a) 100° (b) 80° (c) 50° (d) 40°

8 If the measure of one of the two base angles in the isosceles triangle is 30° , then the triangle is ....

(a) obtuse-angled. (b) acute-angled.

(c) right-angled. (d) equilateral.

9 In Δ ABC , AB = AC , m (∠ B) = $6X°$, m (∠ A) = $3X°$, then $X =$ ....

(a) 30° (b) 12° (c) 60° (d) 90°

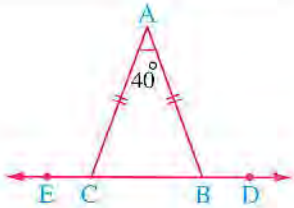
10 In Δ XYZ , if XY = XZ , then the exterior angle at the vertex Z is ....

(a) acute. (b) obtuse. (c) right. (d) reflex.

4 **In the opposite figure :**

ABC is an isosceles triangle in which AB = AC ,

m (∠ A) = 40° and D ∈ $\overrightarrow{CB}$, E ∈ $\overrightarrow{BC}$



1 **Find :** m (∠ ABC)

2 **Prove that :** ∠ ABD ≡ ∠ ACE

« 70° »

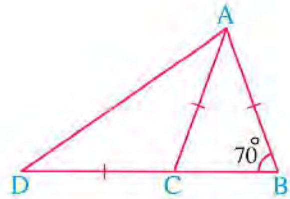
5 **In the opposite figure :**

AB = AC = CD

and m (∠ B) = 70°

Find by proof :

m (∠ BAD)



« 75° »

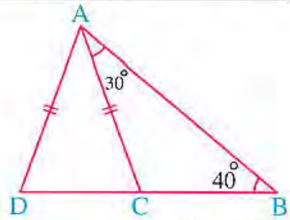
6 **In the opposite figure :**

m (∠ B) = 40° , m (∠ BAC) = 30°

and AC = AD

Find by proof :

1 m (∠ D) 2 m (∠ CAD)



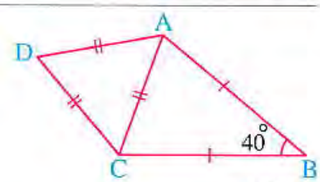
« 70° , 40° »

7 **In the opposite figure :**

AD = DC = AC , AB = BC

and m (∠ ABC) = 40°

Find : m (∠ BAD)



« 130° »

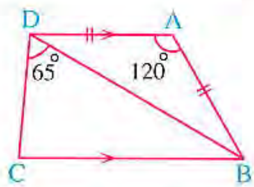
8 **In the opposite figure :**

AB = AD , $\overline{AD}$ // $\overline{BC}$,

m (∠ BAD) = 120° and m (∠ BDC) = 65°

Find :

1 m (∠ ADB) 2 m (∠ C)



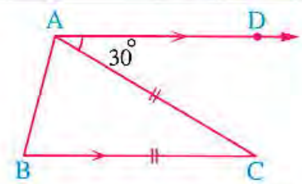
« 30° , 85°»

9 **In the opposite figure :**

ABC is a triangle in which AC = BC ,

$\overrightarrow{AD}$ // $\overline{BC}$ and m (∠ DAC) = 30°

Find : The measures of the angles of Δ ABC



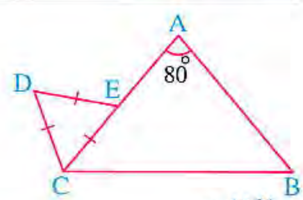
« 30° , 75° , 75° »

10 **In the opposite figure :**

AB = AC , m (∠ BAC) = 80°

and CE = ED = CD

Find by proof : m (∠ BCD)



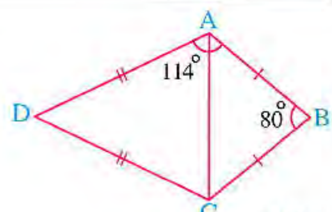
« 110° »

11 **In the opposite figure :**

AB = BC , AD = CD , m (∠ BAD) = 114°

and m (∠ B) = 80°

Find : m (∠ ADC)



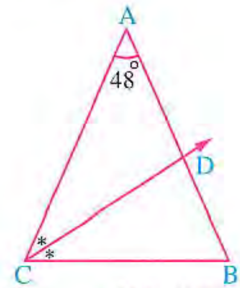
« 52° »

12 **In the opposite figure :**

AB = AC , m (∠ BAC) = 48° , $\overrightarrow{CD}$ bisects ∠ BCA and intersects $\overline{AB}$ at D

Find :

1 m (∠ B) 2 m (∠ BCD)

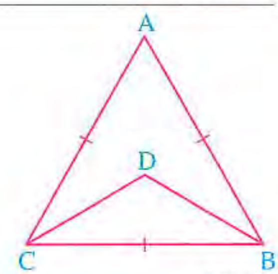


« 66° , 33° »

13 **In the opposite figure :**

ABC is an equilateral triangle and the two bisectors of ∠ B and ∠ C intersect together at D

Find : m (∠ BDC)

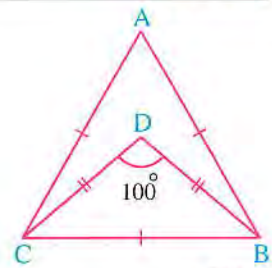


« 120° »

14 **In the opposite figure :**

ABC is an equilateral triangle , DB = DC and m (∠ BDC) = 100°

Find by proof : m (∠ ABD)



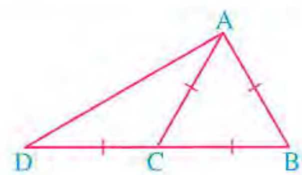
« 20° »

15 **In the opposite figure :**

ABC is an equilateral triangle.

D ∈ $\overrightarrow{BC}$ such that BC = CD

Prove that : $\overline{BA} \perp \overline{AD}$

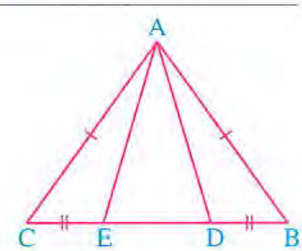


16 **In the opposite figure :**

ABC is an isosceles triangle in which AB = AC , D ∈ $\overline{BC}$ and E ∈ $\overline{BC}$, such that BD = EC

Prove that : 1 Δ ADE is an isosceles triangle.

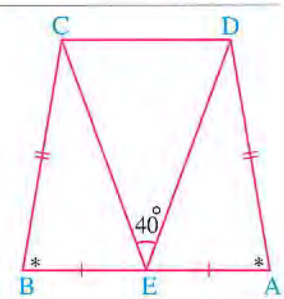
2 ∠ AED ≡ ∠ ADE



17 **In the opposite figure :**

E is the midpoint of $\overline{AB}$, AD = BC , m (∠ A) = m (∠ B) and m (∠ DEC) = 40°

Find : m (∠ EDC)



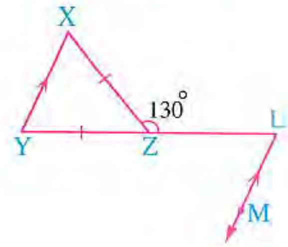
« 70° »

18 **In the opposite figure :**

$Z \in \overline{LY}$, $XZ = YZ$, m ($\angle$ LZX) = 130°

and $\overrightarrow{LM} \mathbin{/\!/} \overline{XY}$

Find : m ($\angle$ MLY)



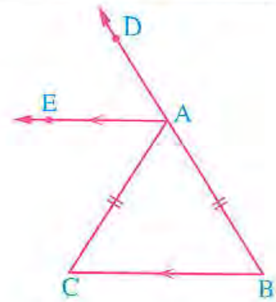
« 65° »

19 **In the opposite figure :**

$A \in \overrightarrow{BD}$, AB = AC and $\overrightarrow{AE} \mathbin{/\!/} \overline{BC}$

Prove that :

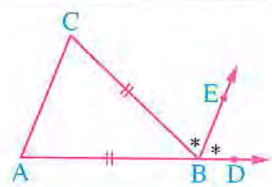
$\overrightarrow{AE}$ bisects $\angle$ DAC



20 **In the opposite figure :**

AB = BC and $\overrightarrow{BE}$ bisects $\angle$ CBD

Prove that : $\overrightarrow{BE} \mathbin{/\!/} \overline{AC}$



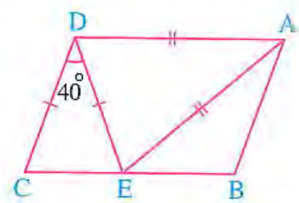
21 **In the opposite figure :**

ABCD is a parallelogram , $E \in \overline{BC}$,

where AE = AD , DE = DC and m ($\angle$ EDC) = 40°

Find : 1 m ($\angle$ AED)

2 m ($\angle$ BAE)



« 70° , 30° »

22 **In the opposite figure :**

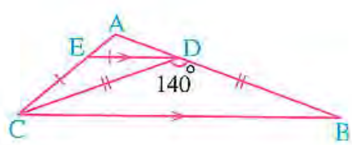
ABC is a triangle in which

$D \in \overline{AB}$, $E \in \overline{AC}$

where $\overline{DE} \mathbin{/\!/} \overline{BC}$, DE = EC

, DB = DC and m ($\angle$ BDC) = 140°

Find : m ($\angle$ A)



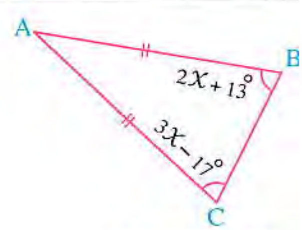
« 120° »

23 **In the opposite figure :**

AB = AC , m ($\angle$ B) = $2X + 13°$

and m ($\angle$ C) = $3X - 17°$

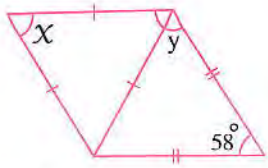
Find : The measures of the angles of Δ ABC



« 73° , 73° , 34° »

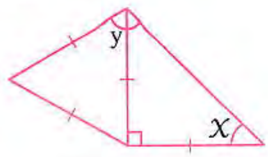
24 **In each of the following figures , find the value of the symbol used for the measure of the angle :**

1



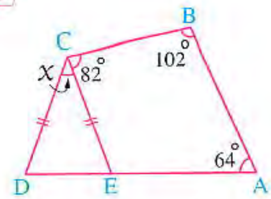
x = ...° ,
y = ...°

2



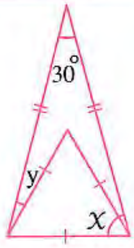
x = ...° ,
y = ...°

3



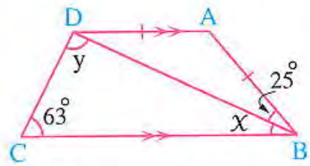
x = ...°

4



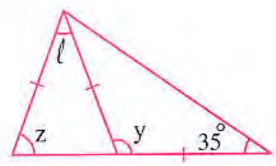
x = ...° ,
y = ...°

5



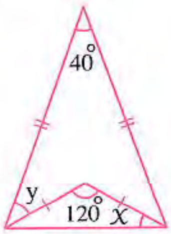
x = ...° ,
y = ...°

6



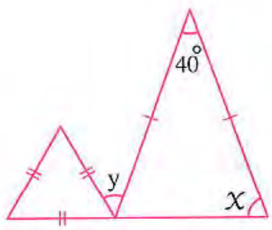
y = ...° , ℓ = ...° ,
z = ...°

7



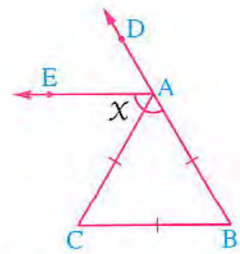
x = ...° ,
y = ...°

8



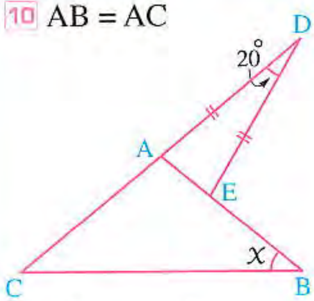
x = ...° ,
y = ...°

9 $\overrightarrow{AE}$ bisects ∠ CAD



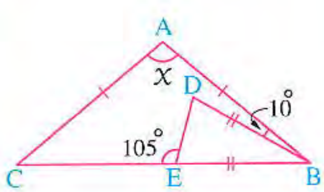
x = ...°

10 AB = AC



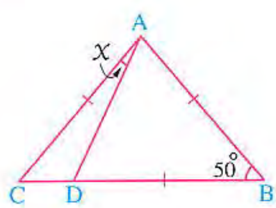
x = ...°

11



x = ...°

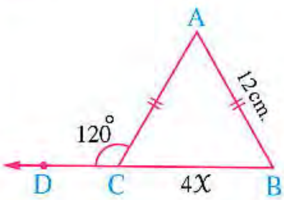
12



x = ...°

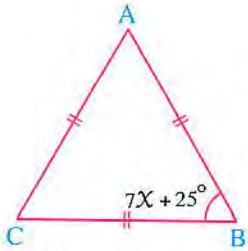
25 **Find the value of $\mathcal{X}$ in each of the following figures :**

1



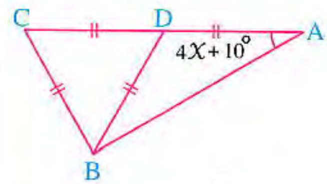
$\mathcal{X} = \dots\dots\dots$ cm.

2



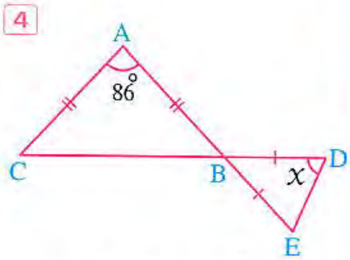
$\mathcal{X} = \dots\dots\dots^\circ$

3



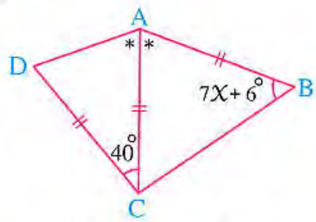
$\mathcal{X} = \dots\dots\dots^\circ$

4



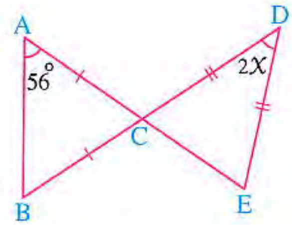
$\mathcal{X} = \dots\dots\dots^\circ$

5



$\mathcal{X} = \dots\dots\dots^\circ$

6



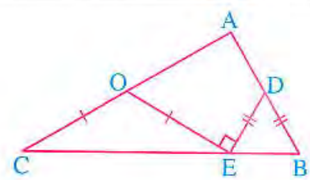
$\mathcal{X} = \dots\dots\dots^\circ$

26 **In the opposite figure :**

ABC is a triangle in which $D \in \overline{AB}$, $E \in \overline{BC}$, $O \in \overline{AC}$

where m ($\angle$ DEO) = 90° , DB = DE and OE = OC

Find : m ($\angle$ A)



« 90° »

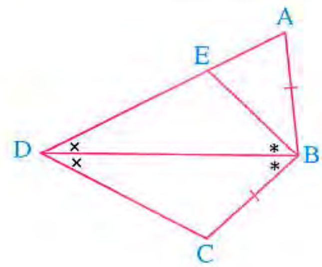
27 **In the opposite figure :**

BA = BC , $E \in \overline{AD}$

and $\overleftrightarrow{BD}$ bisects each

of $\angle$ CBE and $\angle$ CDE

Prove that : m ($\angle$ A) + m ($\angle$ C) = 180°



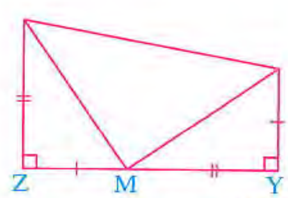
For excellent pupils

28 **In the opposite figure :**

m ($\angle$ Y) = m ($\angle$ Z) = 90°

, XY = MZ and YM = ZL

Find by proof : m ($\angle$ MXL)



« 45° »

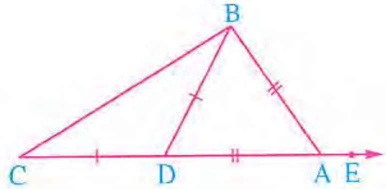
● Remember ● Understand ○ Apply ● Problem Solving

29 **In the opposite figure :**

ABC is a triangle , D $\in \overline{AC}$ such that BD = DC

AD = AB and E $\in \overrightarrow{CA}$

Prove that : m ($\angle$ BAE) = 4 m ($\angle$ BCD)

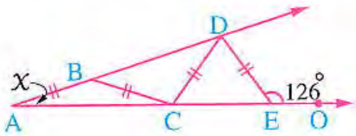


30 **In the opposite figure :**

m ($\angle$ A) = $x°$, AB = BC = CD = DE

and m ($\angle$ DEO) = 126°

Find : The value of x



« 18° »

Wonders of numbers

- Pick any positive 2-digit number, add the two digits, and subtract the sum from the original number.
- Is the difference divisble by 9 ?

Try other numbers.

Accumulative tests ? on Geometry

Accumulative test 1 on lesson 1 – unit 4

1 Choose the correct answer from the given ones :

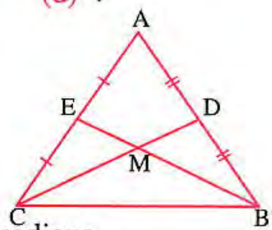
1. If M is the point of intersection of the medians of Δ ABC , $\overline{AD}$ is a median , then AD = ……………

   (a) 2 AM (b) $\frac{2}{3}$ MD (c) $\frac{3}{2}$ AM (d) 4 MD

2. The point of intersection of medians of the triangle divides each of them in the ratio 4 : …………… from the base.

   (a) 2 (b) 8 (c) 1 (d) 4

3. **In the opposite figure :**

   BM = 6 cm. , then ME = …………… cm.

   (a) 3 (b) 6
   (c) 7 (d) 9

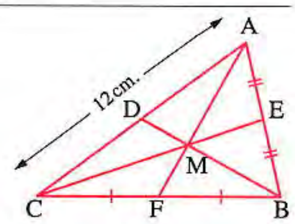
4. In Δ ABC , $\overline{AD}$ is a median , M is the point of intersection of its medians , then $(AM)^2$ = …………… $(AD)^2$

   (a) 2 (b) $\frac{3}{2}$ (c) $\frac{4}{9}$ (d) $\frac{1}{2}$

2 Complete the following :

1. The point of concurrence of the medians of the triangle divides each median in the ratio …………… from the vertex.
2. If $\overline{AD}$ is a median in Δ ABC , M is the point of intersection of the medians , MD = 2 cm. , then AM = …………… cm.
3. The number of medians of the scalene triangle is ……………
4. The medians of the triangle intersect at ……………

3 In the opposite figure :

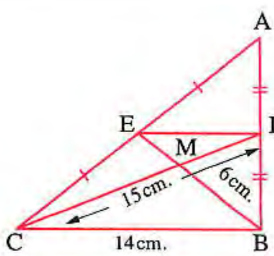


E is the midpoint of $\overline{AB}$

, F is the midpoint of $\overline{BC}$, AC = 12 cm.

Find with proof : The length of $\overline{AD}$

4 In the opposite figure :



M is the point of intersection of the medians of Δ ABC

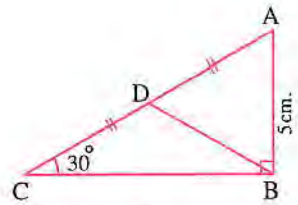
, BM = 6 cm. , BC = 14 cm. , DC = 15 cm.

Find : The perimeter of Δ MDE

Accumulative test 2 till lesson 2 – unit 4

1 **Choose the correct answer from the given ones :**

1 **In the opposite figure :**



ABC is a right-angled triangle at B

, D is the midpoint of $\overline{AC}$, m (∠ ACB) = 30°

, AB = 5 cm. , then BD = ... cm.

(a) 5 (b) 10 (c) 2.5 (d) 15

2 If $\overline{BD}$ is a median in Δ ABC , BD = $\frac{1}{2}$ AC , then ....

(a) m (∠ ABC) = 90° (b) m (∠ BAC) = 90°

(c) m (∠ ABC) = 30° (d) m (∠ ACB) = 90°

3 If M is the point of intersection of the medians of Δ ABC , D is the midpoint of $\overline{BC}$, then MD : AD = ...

(a) 1 : 2 (b) 2 : 3 (c) 1 : 3 (d) 3 : 2

4 A rectangle , its diagonals intersect at M , the length of its diagonal is 6 cm. , then the length of the median $\overline{AM}$ is ....

(a) 1 cm. (b) 2 cm. (c) 3 cm. (d) 4 cm.

---

2 **Complete the following :**

1 The length of the side opposite to the angle of measure 30° in the right-angled triangle equals ....

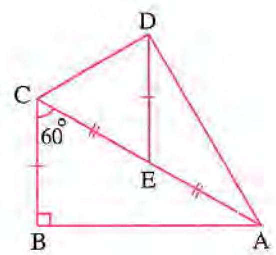
2 The point of intersection of the medians of the triangle divides each median in the ratio 2 : .... from the base.

3 If M is the point of intersection of the medians of Δ ABC , $\overline{AD}$ is a median its length is 6 cm. , then AM = ... cm.

4 If ABC is a right-angled triangle at B , AB = 3 cm. , BC = 4 cm. , then the length of the median drawn from B to $\overline{AC}$ = ...

---

3 **In the opposite figure :**



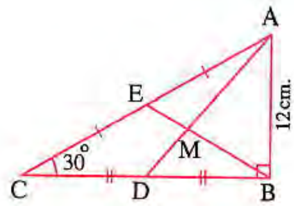
ABC is a right-angled triangle at B

, m (∠ ACB) = 60°

, E is the midpoint of $\overline{AC}$, DE = BC

Prove that : m (∠ ADC) = 90°

4 In the opposite figure :



ABC is a right-angled triangle at B

, $m(\angle C) = 30°$, D is the midpoint of $\overline{BC}$

, E is the midpoint $\overline{AC}$, $\overline{AD} \cap \overline{BE} = \{M\}$

, if AB = 12 cm. , AD = 15 cm.

Find with proof :

1 The length of $\overline{AE}$

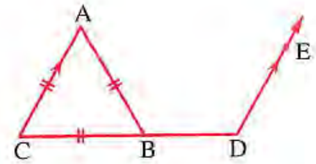
2 The length of $\overline{ME}$

3 The perimeter of Δ AME

Accumulative test 3 till lesson 3 – unit 4

1 **Choose the correct answer from the given ones :**

1 **In the opposite figure :**



ABC is an equilateral triangle

, $\overrightarrow{DE}$ // $\overline{CA}$, then m (∠ D) = ...

(a) 100° (b) 60°

(c) 120° (d) 150°

2 The point of intersection of the medians of the triangle divides each median in the ratio .... from the base.

(a) 1 : 2 (b) 2 : 1 (c) 3 : 1 (d) 1 : 3

3 ABC is a right-angled triangle at B , AC = 20 cm. , D is the midpoint of $\overline{AC}$, then BD = ... cm.

(a) 10 (b) 8 (c) 6 (d) 5

4 In Δ ABC , if AB = AC , m (∠ A) = 2 m (∠ B) , then m (∠ C) = ...

(a) 30° (b) 45° (c) 60° (d) 90°

2 **Complete the following :**

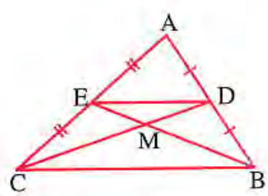
1 The two base angles of the isosceles triangle are ....

2 If ABC is a right-angled triangle at B , m (∠ C) = 30° , AC = 8 cm. , then AB = ... cm.

3 If the measure of the vertex angle of an isosceles triangle is 80° , then the measure of its base angles = ... °

4 The measure of the exterior angle of the equilateral triangle is .... °

3 **In the opposite figure :**

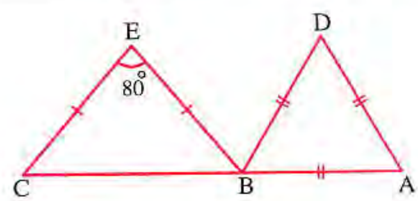


$\overline{BE}$, $\overline{CD}$ are two medians in Δ ABC intersect at point M

, the perimeter of Δ MDE = 12 cm.

Find : The perimeter of Δ MBC

4 **In the opposite figure :**



B ∈ $\overline{AC}$, Δ ABD is equilateral

, EB = EC , m (∠ E) = 80°

Find : m (∠ DBE)

Test 1

Total mark

10

1 Choose the correct answer from the given ones : (3 marks)

1 If $-\sqrt{25} = \sqrt[3]{y}$, then y = ...

ⓐ 5 ⓑ –5 ⓒ 125 ⓓ –125

2 The irrational number included between –2 and –1 is ....

ⓐ –3 ⓑ $-1\frac{1}{3}$ ⓒ $-\sqrt{3}$ ⓓ $\sqrt{2}$

3 If x is a negative real number , then which of the following represents a positive number ?

ⓐ x^2 ⓑ x^3 ⓒ $3x$ ⓓ $\frac{x}{3}$

2 Complete : (3 marks)

1 $\mathbb{R}_+ \cup \mathbb{R}_- =$ ....

2 The S.S. of the equation : $(x-\sqrt{5})(x+\sqrt{3}) = 0$ in $\grave{\mathbb{Q}}$ is ....

3 A square of area 7 cm^2 , then its side length = ... cm.

3 Prove that : $\sqrt{2}$ lies between 1.4 and 1.5 (2 marks)

4 The capacity of a cube is 27 litres. Find its inner edge length. (2 marks)

Test 2

Total mark
10

1 Choose the correct answer from the given once : (3 marks)

1 $\mathbb{R}_+ \cap \mathbb{R}_- =$ ....

ⓐ $\mathbb{R}^*$ ⓑ $\mathbb{R}$ ⓒ $\mathbb{Q}$ ⓓ $\varnothing$

2 $\sqrt[3]{0.001 \times \frac{1}{8}} =$ ....

ⓐ $\frac{1}{2}$ ⓑ 2 ⓒ $\frac{1}{20}$ ⓓ 20

3 A square of side length $\sqrt{3}$ cm. , then its area is .... cm^2

ⓐ $4\sqrt{3}$ ⓑ 9 ⓒ 3 ⓓ 6

2 Complete : (3 marks)

1 If $x^3 = 27$, then $x =$ ....

2 $\mathbb{Q} \cup \grave{\mathbb{Q}} =$ ....

3 The S.S. of the equation : $x^2 + 4 = 0$ in $\mathbb{R}$ is ....

3 Find in $\mathbb{R}$ the S.S. of the equation : $2 + x^3 = 1$ (2 marks)

4 Find the value of x in each of the following : (2 marks)

1 $\sqrt[3]{x} = \frac{1}{2}$

2 $x^3 + 5 = 32$

Test 1

Total mark 10

1 Choose the correct answer from the given ones : (3 marks)

1. The number of medians of the right-angled triangle is ....

   (a) zero (b) 1 (c) 2 (d) 3

2. ABC is a right-angled triangle at B , D is the midpoint of $\overline{AC}$, then BD = ...

   (a) $\frac{1}{2}$ AC (b) AC (c) $\frac{1}{2}$ BC (d) AB

3. Δ XYZ is an isosceles triangle in which , m ($\angle$ Y) = 100° , then m ($\angle$ Z) = ...

   (a) 100° (b) 80° (c) 50° (d) 40°

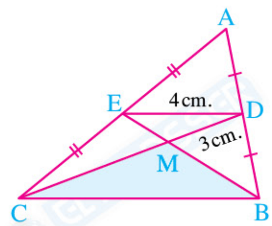
2 Complete : (3 marks)

1. The length of the hypotenuse in the right-angled triangle equals .... the length of the median drawn from the vertex of the right angle.

2. The measure of the exterior angle of the equilateral triangle equals ....°

3. The point of intersection of medians of the triangle divides each of them in the ratio .... : 2 from the base.

3 In the opposite figure : (2 marks)



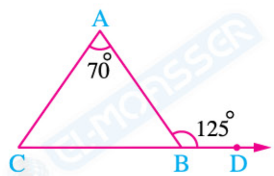
If D and E are the midpoints of $\overline{AB}$ and $\overline{AC}$ respectively

, $\overline{BE} \cap \overline{DC} = \{M\}$, DE = 4 cm.

, DM = 3 cm. , BE = 6 cm.

Find : The perimeter of Δ BMC

4 In the opposite figure : (2 marks)



D $\in \overrightarrow{CB}$, m ($\angle$ ABD) = 125°

and m ($\angle$ A) = 70°

Prove that : Δ ABC is an isosceles triangle.

Test 2

Total mark 10

1 Choose the correct answer from the given ones : (3 marks)

1 If M is the point of concurrence of medians of Δ ABC , $\overline{BD}$ is a median , then BM : MD = ...

(a) 2 : 3 (b) 2 : 1 (c) 3 : 1 (d) 1 : 2

2 In Δ ABC , if m ($\angle$ B) = 90° and m ($\angle$ C) = 30° , then AB = ... AC

(a) $\frac{1}{2}$ (b) $\frac{1}{3}$ (c) twice (d) $\frac{1}{4}$

3 If the measure of one of the base angles of an isosceles triangle is 45° , then the triangle is .... triangle.

(a) obtuse-angled. (b) acute-angled. (c) right-angled. (d) equilateral.

2 Complete : (3 marks)

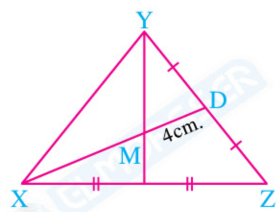
1 The medians of the triangle intersect at ....

2 The length of the side opposite to the angle of measure 30° in the right-angled triangle equals ....

3 **In the opposite figure :**

If DM = 4 cm.

, then XD = ... cm.

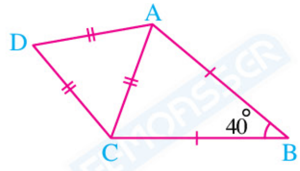


3 In the opposite figure : (2 marks)

AD = DC = AC , AB = BC

, m ($\angle$ ABC) = 40°

Find : m ($\angle$ BAD)



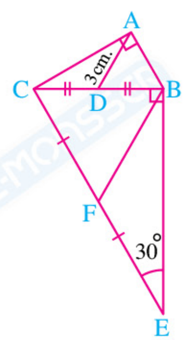
4 In the opposite figure : (2 marks)

m ($\angle$ BAC) = m ($\angle$ CBE) = 90° , m ($\angle$ BEC) = 30°

, D and F are the midpoints of $\overline{BC}$ and $\overline{CE}$ respectively

, AD = 3 cm.

Find : the length of $\overline{BF}$



Answers of Test 1

1 1 (d) 2 (c) 3 (a)

2 1 $\mathbb{R}^*$ or $\mathbb{R}-\{0\}$ 2 $\{\sqrt{5}, -\sqrt{3}\}$ 3 $\sqrt{7}$

3 $\because (\sqrt{2})^2 = \sqrt{2}\times\sqrt{2} = 2$, $(1.4)^2 = 1.96$, $(1.5)^2 = 2.25$

$\therefore 1.96 < 2 < 2.25$ $\therefore \sqrt{1.96} < \sqrt{2} < \sqrt{2.25}$

$\therefore 1.4 < \sqrt{2} < 1.5$ $\therefore \sqrt{2}$ lies between 1.4 , 1.5

4 27 litres × 1000 = 27000 cm^3 $\because$ volume of the cube $= \ell^3$

$\therefore \ell^3 = 27000$ $\therefore \ell = \sqrt[3]{27000}$ $\therefore \ell = 30$ cm.

Answers of Test 2

1 1 (d) 2 (c) 3 (c)

2 1 3 2 $\mathbb{R}$ 3 $\varnothing$

3 $\because 2 + x^3 = 1$ $\therefore x^3 = 1 - 2 = -1$

$\therefore x = \sqrt[3]{-1} = -1$ $\therefore$ The S.S. $= \{-1\}$

4 1 $\because \sqrt[3]{x} = \frac{1}{2}$ $\therefore x = \left(\frac{1}{2}\right)^3 = \frac{1}{8}$

2 $\because x^3 + 5 = 32$ $\therefore x^3 = 32 - 5 = 27$

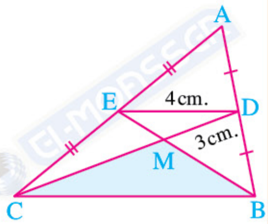
$\therefore x = \sqrt[3]{27} = 3$

Answers of Test 1

1 1 ⓓ 2 ⓐ 3 ⓓ

2 1 twice 2 120° 3 1

3 $\because$ D is the midpoint of $\overline{AB}$



, E is the midpoint of $\overline{AC}$ (given)

$\therefore$ BC = 2DE $\therefore$ BC = 8 cm.

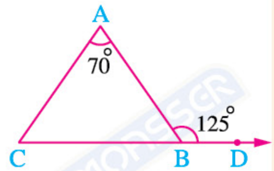
$\because$ M is the point of intersection of medians of Δ ABC

$\therefore$ MC = 2DM $\therefore$ MC = 6 cm.

, BM = $\frac{2}{3}$ BE $\therefore$ BM = 4 cm.

$\therefore$ The perimeter of Δ BMC = 8 + 6 + 4 = 18 cm. (The req.)

4 $\because$ B $\in \overline{DC}$



$\therefore$ m ($\angle$ ABC) = 180° – 125° = 55°

In Δ ABC : m ($\angle$ C) = 180° – (55° + 70°) = 55°

$\therefore$ m ($\angle$ ABC) = m ($\angle$ C)

$\therefore$ AB = AC

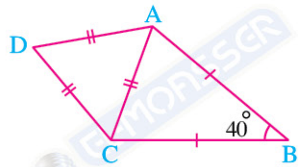
$\therefore$ Δ ABC is an isosceles triangle. (The req.)

Answers of Test 2

1 1 (b) 2 (a) 3 (c)

2 1 one point 2 half length of the hypotenuse 3 12 cm.

3 $\because$ Δ ACD is an equilateral triangle



$\therefore$ m ($\angle$ CAD) = 60° (1)

In Δ ABC :

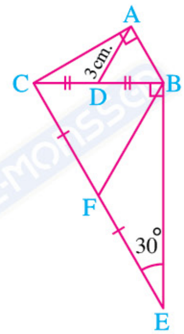
$\because$ AB = BC

$\therefore$ m ($\angle$ BAC) = m ($\angle$ BCA) = $\frac{180° - 40°}{2}$ = 70° (2)

From (1) , (2) :

$\therefore$ m ($\angle$ BAD) = 60° + 70° = 130° (The req.)

4 In Δ ABC :



$\because$ m ($\angle$ BAC) = 90° , D is the midpoint of $\overline{BC}$

$\therefore$ BC = 2AD = 2 × 3 = 6 cm.

In Δ CBE :

$\because$ m ($\angle$ CBE) = 90° , m ($\angle$ E) = 30°

$\therefore$ EC = 2BC = 2 × 6 = 12 cm.

$\because$ F is the midpoint of $\overline{EC}$

$\therefore$ BF = $\frac{1}{2}$ EC = $\frac{1}{2}$ × 12 = 6 cm. (The req.)

Total mark
10

Test 1

1 **Choose the correct answer from the given ones :** (3 marks)

1 If $-\sqrt{25}=\sqrt[3]{y}$, then y = ...

(a) 5 (b) –5 (c) 125 (d) –125

2 The irrational number included between –2 and –1 is ....

(a) –3 (b) $-1\frac{1}{3}$ (c) $-\sqrt{3}$ (d) $\sqrt{2}$

3 If x is a negative real number , then which of the following represents a positive number ?

(a) x^2 (b) x^3 (c) $3x$ (d) $\frac{x}{3}$

---

2 **Complete :** (3 marks)

1 $\mathbb{R}_+ \cup \mathbb{R}_- =$ ....

2 The S.S. of the equation : $(x-\sqrt{5})(x+\sqrt{3})=0$ in $\grave{\mathbb{Q}}$ is ....

3 A square of area 7 cm^2 , then its side length = ... cm.

---

3 **Prove that :** $\sqrt{2}$ lies between 1.4 and 1.5 (2 marks)

---

4 The capacity of a cube is 27 litres. Find its inner edge length. (2 marks)

Test 2

Total mark
10

1 Choose the correct answer from the given ones : (3 marks)

1 $\mathbb{R}_+ \cap \mathbb{R}_- =$ ....

(a) $\mathbb{R}^*$ (b) $\mathbb{R}$ (c) $\mathbb{Q}$ (d) $\varnothing$

2 $\sqrt[3]{0.001 \times \frac{1}{8}} =$ ....

(a) $\frac{1}{2}$ (b) 2 (c) $\frac{1}{20}$ (d) 20

3 A square of side length $\sqrt{3}$ cm. , then its area is .... cm^2

(a) $4\sqrt{3}$ (b) 9 (c) 3 (d) 6

---

2 Complete : (3 marks)

1 If $x^3 = 27$, then $x =$ ....

2 $\mathbb{Q} \cup \mathbb{Q}' =$ ....

3 The S.S. of the equation : $x^2 + 4 = 0$ in $\mathbb{R}$ is ....

---

3 Find in $\mathbb{R}$ the S.S. of the equation : $2 + x^3 = 1$ (2 marks)

---

4 Find the value of x in each of the following : (2 marks)

1 $\sqrt[3]{x} = \frac{1}{2}$

2 $x^3 + 5 = 32$

Test 1

Total mark 10

1 Choose the correct answer from the given ones : (3 marks)

1 The number of medians of the right-angled triangle is ....

(a) zero (b) 1 (c) 2 (d) 3

2 ABC is a right-angled triangle at B , D is the midpoint of $\overline{AC}$, then BD = ...

(a) $\frac{1}{2}$ AC (b) AC (c) $\frac{1}{2}$ BC (d) AB

3 Δ XYZ is an isosceles triangle in which , m (∠ Y) = 100° , then m (∠ Z) = ...

(a) 100° (b) 80° (c) 50° (d) 40°

---

2 Complete : (3 marks)

1 The length of the hypotenuse in the right-angled triangle equals .... the length of the median drawn from the vertex of the right angle.

2 The measure of the exterior angle of the equilateral triangle equals ....°

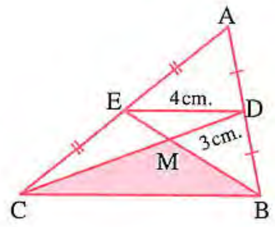
3 The point of intersection of medians of the triangle divides each of them in the ratio .... : 2 from the base.

---

3 In the opposite figure : (2 marks)

If D and E are the midpoints of $\overline{AB}$ and $\overline{AC}$ respectively , $\overline{BE} \cap \overline{DC} = \{M\}$, DE = 4 cm. , DM = 3 cm. , BE = 6 cm.

Find : The perimeter of Δ BMC



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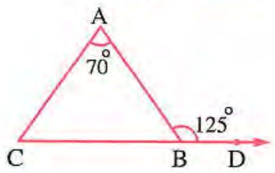
4 In the opposite figure : (2 marks)

D ∈ $\overrightarrow{CB}$, m (∠ ABD) = 125° and m (∠ A) = 70°

Prove that : Δ ABC is an isosceles triangle.



Total mark
10

Test 2

1 Choose the correct answer from the given ones : (3 marks)

1 If M is the point of concurrence of medians of Δ ABC , $\overline{BD}$ is a median , then BM : MD = ...

(a) 2 : 3 (b) 2 : 1 (c) 3 : 1 (d) 1 : 2

2 In Δ ABC , if m ($\angle$ B) = 90° and m ($\angle$ C) = 30° , then AB = ... AC

(a) $\frac{1}{2}$ (b) $\frac{1}{3}$ (c) twice (d) $\frac{1}{4}$

3 If the measure of one of the base angles of an isosceles triangle is 45° , then the triangle is .... triangle.

(a) obtuse-angled. (b) acute-angled. (c) right-angled. (d) equilateral.

2 Complete : (3 marks)

1 The medians of the triangle intersect at ....

2 If the length of the median drawn from a vertex of a triangle equals half the length of the opposite side to this vertex , then ....

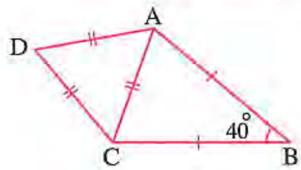
3 The isosceles triangle in which the measure of one of its angles equals 60° is ....

3 In the opposite figure : (2 marks)

AD = DC = AC , AB = BC

, m ($\angle$ ABC) = 40°

Find : m ($\angle$ BAD)



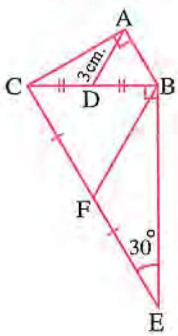
4 In the opposite figure : (2 marks)

m ($\angle$ BAC) = m ($\angle$ CBE) = 90° , m ($\angle$ BEC) = 30°

, D and F are the midpoints of $\overline{BC}$ and $\overline{CE}$ respectively

, AD = 3 cm.

Find : the length of $\overline{BF}$



FIRST ALGERBA

Q1: Choose the correct answer:

1) If $-\sqrt{25} = \sqrt[3]{y}$, then y = ...

ⓐ 5 ⓑ -5 ⓒ 125 ⓓ -125

2) If $x^3 = 64$, then x = ...

ⓐ 4 ⓑ -4 ⓒ 2 ⓓ -2

3) If $\frac{x}{3} = \frac{9}{x^2}$, then x = ...

ⓐ 1 ⓑ 3 ⓒ 9 ⓓ 27

4) The irrational number located between 2 and 3 is ....

ⓐ $\sqrt{7}$ ⓑ $\sqrt{10}$ ⓒ 2.5 ⓓ $\sqrt{3}$

5) $\sqrt{6} \in$........

ⓐ N ⓑ Q ⓒ Q\` ⓓ Z

6) $\sqrt[3]{9}$ ...... $\sqrt{4}$

ⓐ > ⓑ < ⓒ = ⓓ ≤

7) The irrational number located between 4 and 5 is ....

ⓐ $\sqrt{8}$ ⓑ $4\sqrt{2}$ ⓒ $3\sqrt{2}$ ⓓ $\sqrt{10}$

8) If X is a negative number, then which of the following numbers is positive?

ⓐ x^3 ⓑ 2x ⓒ x^2 ⓓ $\frac{x}{2}$

9) R = ...

ⓐ $R_+ \cup R_-$ ⓑ $R_+ \cap R_-$ ⓒ]-∞ , ∞[ⓓ Q ∩ Q\`

10) The set of non-negative real numbers = ...

ⓐ]0 , ∞[ⓑ]-∞ , 0[ⓒ [0 , ∞[ⓓ]-∞ , 0]

FIRST ALGERBA

11) The S.S of the equation: $x^3 = 8$ in Q is ....

ⓐ {-2} ⓑ {2} ⓒ {-2 , 2} ⓓ {64}

12) [3 , 5] − {5}= ....

ⓐ [3 , 4] ⓑ [3 , 5[ⓒ {3 , 4} ⓓ]3 , 5]

13) If x $<\sqrt[3]{36}$ < x + 1, x ∈ Z, then x = ...

ⓐ 2 ⓑ 3 ⓒ 4 ⓓ 6

14) The S.S of the equation: $x^2 + 9 = 0$ in R is ....

ⓐ {-9} ⓑ {-3 , 3} ⓒ {-3} ⓓ ∅

15) $\sqrt[3]{(-8)^2}$ = ...

ⓐ -4 ⓑ -2 ⓒ 2 ⓓ 4

16) If X = [-1 , ∞[, Then X\` = ...

ⓐ]-∞ , -1] ⓑ]-∞ , -1[ⓒ [-∞ , 1[ⓓ]-∞ , 1]

17)]-1 , 3] ∪ {0 , -1} = ...

ⓐ]0 , 3] ⓑ]-1, 3[ⓒ [- 1 , 3] ⓓ [0 , 3]

18) $\sqrt{5}$ .... {2 , 5}

ⓐ ⊂ ⓑ ∉ ⓒ ∈ ⓓ ⊄

19) $\sqrt{25 + 144}$ = 5 + ...

ⓐ 12 ⓑ 13 ⓒ 8 ⓓ 6

20) The solution set of the equation: $x(x^2 - 1) = 0$ in R is ....

ⓐ {0} ⓑ {1} ⓒ {-1} ⓓ {0 , -1 , 1}

21) The irrationl number in the following numbers is ....

ⓐ $\sqrt{\frac{25}{9}}$ ⓑ $\sqrt[3]{\frac{1}{27}}$ ⓒ $\sqrt{3}$ ⓓ $\sqrt[3]{125}$

FIRST ALGERBA

22) The sum of all real numbers in [- 75, 75] is ....

ⓐ 75 ⓑ -75 ⓒ 150 ⓓ zero

23) $\{3\} \cap [3, 6] =$ ....

ⓐ $\{3\}$ ⓑ $\varnothing$ ⓒ $]3, 6]$ ⓓ $\{6\}$

24) $R_+ \cup R_- =$ ....

ⓐ R ⓑ $\varnothing$ ⓒ R_+ ⓓ R^*

25) The area of a square whose side length is $\sqrt{3}$ cm is .... cm^2

ⓐ $4\sqrt{3}$ ⓑ 9 ⓒ 3 ⓓ 6

26) The nearest integer to $\sqrt[3]{25}$ is ....

ⓐ 5 ⓑ 3 ⓒ 2 ⓓ 12.5

27) The irrational number located between 2 and 3 is ....

ⓐ $\sqrt{3}$ ⓑ $\sqrt{-1}$ ⓒ $\sqrt{7}$ ⓓ $2\frac{1}{2}$

28) $Q \cap Q` =$ ....

ⓐ R ⓑ $\varnothing$ ⓒ Q ⓓ $Q`$

29) TheS.S of the equation: $X^3 = 8$ in Q is ....

ⓐ $\{-2\}$ ⓑ $\{2\}$ ⓒ $\{2, -2\}$ ⓓ $\{64\}$

30) If $x \in [-3, \infty[$, then ....

ⓐ $x < -3$ ⓑ $x \leq -3$ ⓒ $x > -3$ ⓓ $x \geq -3$

معلش

FIRST ALGERBA

Q2: Complete the following:

1) $Q \cup Q'$ = ...
2) $[3 , 4] - \{3 , 5\}$ = ...
3) $\{-1 , 0 , 1\} \cap]-1 , 1[$ = ...
4) R_+ in an interval form is ....
5) $]-2 , 3] \cap R$ = ...
6) $\sqrt{25 x^8}$ = ...
7) The square whose side length is $\sqrt{7}$ cm. its area is ....
8) The S.S of the equation: $X^2 + 16 = 0$ in R is ....
9) If $-x > 4$, then $x <$ ....
10) If x is a positive real number, then $X > X^2$ when $X \in]$ .... , ... $[$
11) $]-3 , 5] \cup \{ -2 , 3 , 4\}$ = ...
12) $[2 , 7] -]2 , 1[$ = ...
13) The square whose area is 10 cm^2, its side length is .... cm
14) $[3 , 5] - \{3 , 5\}$ = ...
15) $R - Q$ = ...

Q3: Answer the following:

1) Arrange the following numbers ascendingly:

$\sqrt{8}$, $-\sqrt{3}$, $\sqrt{15}$, $\sqrt{5}$, $-\sqrt{7}$ and $-\sqrt{11}$

2) Arrange the following numbers descendingly:

$\sqrt{6}$, 9 , $-\sqrt{10}$, $-\sqrt{7}$, $-\sqrt{50}$ and $\sqrt{101}$

3) Write four inational numbers included between 15 and 17
4) Prove that: $\sqrt{11}$ is included between 3.31 and 3.32
5) Prove that: $\sqrt[3]{15}$ is included between 2.4 and 2.5

FIRST ALGERBA

6) If X = [3 , 2[, Y = [-1 , 5],find using the number line:

1- $X \cap Y$ 2- $X \cup Y$ 3- $X - Y$

---

7) If A =]-∞ , 3[, B = [-2 , 5]

Find using the number line :

1- $A - B$ 2- $A \cap B$ 3- $A \cup B$

4- A' 5- B'

---

8) Find in real numbers the S.S of each of the following equations:

a. $125x^3 - 7 = 20$

b. $(x + \sqrt{7})(x^3 - 6) = \text{zero}$

c. $(x^3 + 5)(x^2 - 3) = \text{zero}$

d. $(5x - 2)^3 + 10 = 18$

e. $2x^3 - 5 = x^3 + 3$

QUICK TIPS

If you wait for just the right time to do something, well, that time may never come. In fact, the right time may be right now.

SECOND GEOMETRY

Q1: Choose the correct answer:

1) The number of medians of the right-angled tiangle is ....

ⓐ zero ⓑ 1 ⓒ 2 ⓓ 3

2) $\triangle XYZ$ is an isosceles triangle in which, $m(\angle Y) = 100^\circ$,then $m(\angle Z)$ = ...

ⓐ 100° ⓑ 80° ⓒ 50° ⓓ 40°

3) The length of the median drawn from the vertex of the right-angle in the right-angled triangle equals .... the length of the hypotenuse

ⓐ third ⓑ quarter ⓒ half ⓓ double

4) If the measure of one of the base angles of an isosceles triangle is 40° then the measure of its vertex angle equals ....

ⓐ 100° ⓑ 80° ⓒ 50° ⓓ 40°

5) The point of concurrence of the medians of the triangle divides each of them in the ratio of.............. from the base.

ⓐ 2 : 1 ⓑ 1 : 2 ⓒ 1 : 3 ⓓ 3 : 1

6) If M is the point of intersection of the medians of $\triangle ABC$, D is a midpoint of $\overline{BC}$, then AD = ...

ⓐ 2 AM ⓑ $\frac{2}{3}$ MD ⓒ $\frac{3}{2}$ AM ⓓ 4 MD

7) If M is the point of intercection of the medians of $\triangle ABC$, $\overline{AD}$ is a median of length 6 cm, then AM = ... cm

ⓐ 1 ⓑ 2 ⓒ 4 ⓓ 3

8) In the thirty sixty triangle, the ratio between the length of the median drawn from the vertex of the right angle and the length of the side opposite to the angle of measure 30° is ....

ⓐ 2 : 1 ⓑ 1 : 2 ⓒ 1 : 1 ⓓ 2 : 3

SECOND GEOMETRY

9) In the right-angled triangle, the ratio between the length of the median drawn from the vertex of the right angle and the length of the hypotenuse is ....

(a) 2 : 1 (b) 1 : 2 (c) 1 : 1 (d) 2 : 3

10) In △XYZ , if XY = XZ , then the exterior angle at the vertex Z is ......

(a) acute (b) obtuse (c) right (d) reflex

11) If △ABC is right-angled at A and AB = AC, then m(∠B) = ...

(a) 30° (b) 45° (c) 60° (d) 90°

12) The measure of the exterior angle of the equilateral triangle equals?

(a) 60° (b) 120° (c) 180° (d) 90°

13) In △ABC, AB = AC, m (∠B) = 6 x°, m (∠A) = 3 x°, then x = ...

(a) 60° (b) 30° (c) 12° (d) 90°

14) If the measure of the vertex angle of an isosceles triangle is 80° , then the measure of its base angle is ....

(a) 100° (b) 50° (c) 80° (d) 40°

15) If △ABC is a right-angled triangle at A and AB = AC ,then m(∠B) = ...

(a) 30° (b) 45° (c) 60° (d) 90°

16) The sum of measures of the accumulative angles at a point equals?

(a) 60° (b) 270° (c) 180° (d) 360°

17) The measure of the interior angle of an equilateral triangle equals?

(a) 60° (b) 120° (c) 180° (d) 90°

18) In △ABC, AB = AC, m(∠B) = x + 30° , m(∠C) = 2x + 5° , the x = ...

(a) 25° (b) 20° (c) 35° (d) 65°

19) If ABC is an isosceles triangle, m(∠A) = 60°, AB = 4 cm. then its perimeter = ... cm.

(a) 4 (b) 12 (c) 6 (d) 9

SECOND GEOMETRY

Q2: Complete the following:

1) The base angles of an isosceles triangle are ....
2) The medians of a triangle intersect at ....
3) If the three angles in the triangle are congruent,
   then the triangle is ....
4) If the measure of one angle of an isosceles triangle is 60° ,
   then the triangle is ....
5) In the isosceles triangle , if the measure of one of the two base angles is 65°, then the measure of its vertex angle equals ....
6) The length of the hypotenuse in the right-angled triangle equals .... the length of the median drawn from the vertex of the right angle.
7) If the length of the median drawn from a vertex of a triangle equals half the length of the opposite side to this vertex , then the angle at this vertex is ....
8) The length of the median from the vertex of the right angle in the right-angled triangle equals ....
9) The point of intersection of medians of the triangle divides each of them in the ratio .... : 5 from the vertex
10) The point of intersection of medians of the t angle divides each of them in the ratio 3 : .... from the base.
11) If $\overline{AD}$ is a median in $\triangle ABC$, M is the point of intersection of medians ,then AD = ... AM
12) The number of medians of Scalene triangle is ....

SECOND GEOMETRY

Q3: Answer the following:

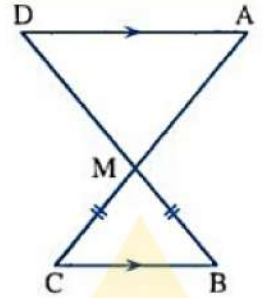
1) In the opposite figure :

If $\overline{AC} \cap \overline{BD} = \{M\}$

, $\overline{AD} \parallel \overline{BC}$ and MB = MC

, prove that :

Δ MAD is isosceles.



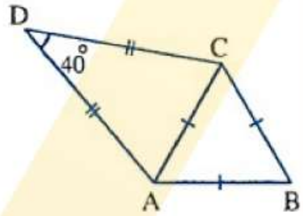
2) In the opposite figure :

m ($\angle$ D) = 40°

, DA = DC

and ΔABC is an equilateral triangle.

Find : m ($\angle$ DCB)

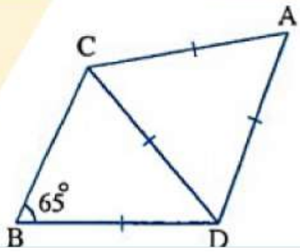


3) In the opposite figure :

AD = DC = AC = BD

, m ($\angle$ B) = 65°

Find with proof : m ($\angle$ BDA)



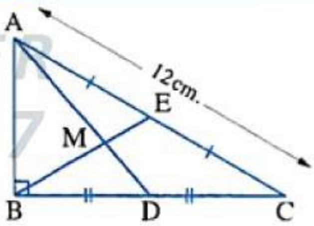
4) In the opposite figure :

Δ ABC is right-angled at B

, E and D are the midpoints of $\overline{AC}$ and $\overline{BC}$ respectively

, AC = 12 cm.

Find the length of each of : $\overline{BE}$ and $\overline{ME}$

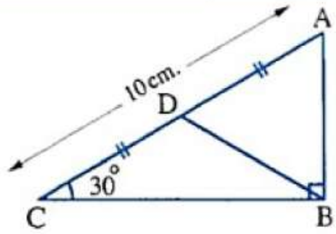


5) In the opposite figure :

m ($\angle$ ABC) = 90° , m ($\angle$ C) = 30°

, AD = DC and AC = 10 cm.

Find : The perimeter of Δ ABD



FIRST ALGERBA

ANSWER MODEL

Q1: Choose the correct answer:

1) d	6) a	11) b	16) b	21) c	26) b
2) a	7) c	12) b	17) c	22) d	27) c
3) b	8) c	13) b	18) b	23) a	28) b
4) a	9) c	14) d	19) c	24) d	29) b
5) c	10) c	15) d	20) d	25) c	30) d

Q2: Complete the following:

1) R
2)]3 , 4]
3) {0}
4)]0 , ∞[
5)]-2 , 3]
6) 5 x^4
7) 7
8) ∅
9) -4
10)] 0 , 1 [
11)]-3 , 5]
12) {2} ∪ [1 , 7]
13) $\sqrt{10}$
14)]3 , 5[
15) Q`

SECOND GEOMETRY

ANSWER MODEL

Q1: Choose the correct answer:

1) d
2) d
3) c
4) a
5) b
6) c
7) c
8) c
9) b
10) b
11) b
12) b
13) c
14) b
15) b
16) d
17) a
18) a
19) b

Q2: Complete the following:

1) Congruent
2) one point
3) equilateral
4) equilateral
5) 50
6) twice
7) right
8) half the hypotenuse
9) 10
10) 6
11) $\frac{3}{2}$
12) 3

Revision for the important rules of Algebra

First Real numbers

Remember that

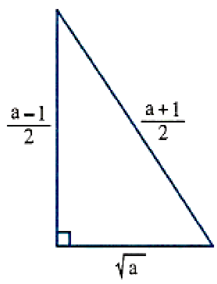
- $\mathbb{R} = \mathbb{Q} \cup \grave{\mathbb{Q}}$
- $\mathbb{Q} \cap \grave{\mathbb{Q}} = \varnothing$
- $\mathbb{R} - \mathbb{Q} = \grave{\mathbb{Q}}$
- $\mathbb{R} - \grave{\mathbb{Q}} = \mathbb{Q}$
- $\mathbb{R}_+ \cap \mathbb{R}_- = \varnothing$
- $\mathbb{R} = \mathbb{R}_+ \cup \{0\} \cup \mathbb{R}_-$
- $\pi \in \grave{\mathbb{Q}}$
- $\mathbb{R}^* = \mathbb{R} - \{0\}$

Remember The representing of the irrational number on the number line

Each irrational number can be represented by a point on the number line.

and to draw a line segment with length $= \sqrt{a}$ length unit where $a > 1$

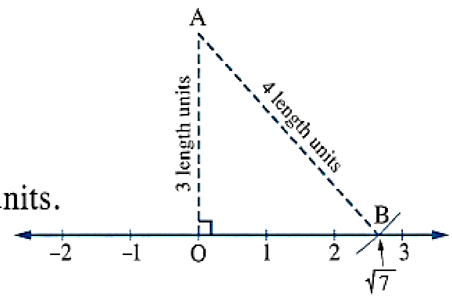
Draw a right-angled triangle in which :



- The length of one side of the right-angle $= \dfrac{a-1}{2}$ length unit.
- The length of the hypotenuse $= \dfrac{a+1}{2}$ length unit.

and we can apply this to represent the irrational number $\sqrt{7}$ on the number line as the following :

- From the point which represents the number zero on the number line , we draw a perpendicular line segment as $\overline{OA}$ where $OA = \dfrac{7-1}{2} = 3$ length units.
- Using the compasses with a distance $= \dfrac{7+1}{2} = 4$ length units. and centre at A , draw an arc to cut the number line on the right side of the point O at the point B , then B is the point which represents $\sqrt{7}$ as in the figure.



- Notice that : To represent the number $\left(-\sqrt{7}\right)$, we draw the arc which cuts the number line on its left side , not on its right side.
- Notice that : To represent the number $\left(1+\sqrt{7}\right)$, we follow the same previous steps but we draw the perpendicular line segment $\overline{OA}$ from the point which represents the number 1 , not the number 0

Remember — The operations on intervals

Intervals	Intersection	Union	Difference	Complement
$X = [-1 , 5[$, $Y =]-3 , 2[$	$X \cap Y = [-1 , 2[$	$X \cup Y =]-3 , 5[$	$X - Y = [2 , 5[$, $Y - X =]-3 , -1[$	$\grave{X} = \mathbb{R} - [-1 , 5[$ $=]-\infty , -1[\cup [5 , \infty[$
$X =]-\infty , 1]$, $Y = [-2 , 1[$	$X \cap Y = [-2 , 1[$	$X \cup Y =]-\infty , 1]$	$X - Y$ $=]-\infty , -2[\cup \{1\}$, $Y - X = \varnothing$	$\grave{X} =]1 , \infty[$
$X = [-1 , 5]$, $Y =]-1 , 5[$	$X \cap Y =]-1 , 5[$	$X \cup Y = [-1 , 5]$	$X - Y = \{-1 , 5\}$, $Y - X = \varnothing$	$\grave{Y} = \mathbb{R} -]-1 , 5[$ $=]-\infty , -1] \cup [5 , \infty[$
$X =]-3 , 4]$, $Y = \{-3 , 4\}$	$X \cap Y = \{4\}$	$X \cup Y = [-3 , 4]$	$X - Y =]-3 , 4[$, $Y - X = \{-3\}$	$\grave{Y} = \mathbb{R} - \{-3 , 4\}$

1 Complete the Following :

1	📖 $\sqrt[3]{a^3} =$ …………
2	$\sqrt[3]{-8} =$ ……………
3	$\lvert\sqrt[3]{-125}\rvert =$ ……….
4	📖 $\lvert\sqrt[3]{-125}\rvert = \sqrt{\ldots\ldots\ldots}$
5	$\sqrt[3]{27} - \sqrt[3]{-27} =$ …………
6	$-\sqrt[3]{-1} - \sqrt{1} =$ …………
7	$\sqrt[3]{64 + \ldots\ldots\ldots} = 5$
8	$\sqrt[3]{\ldots\ldots\ldots} = 4$
9	$\sqrt{16} = \sqrt[3]{\ldots\ldots\ldots}$
10	$\sqrt[3]{64} = \sqrt{\ldots\ldots\ldots}$
11	If : $\sqrt[3]{64} = \sqrt{x}$, then $2x =$ ……………
12	If : $x^2 = 5$, then $\left(x + \sqrt{5}\right)^2 =$ ………. or ……….
13	$\frac{x^3}{y^3} = \frac{1}{64}$, then $\left(\frac{y}{x}\right)^2 =$ ……….
14	If $8 = \sqrt[3]{x}$, then $x =$ ……….
15	If $\sqrt[3]{x} = -\sqrt{4}$, then $x =$ ……………

16	$\sqrt{9+16} = 3 + \cdots\cdots$
17	The solution set for the equation : $x^2 + 1 = 0$ in $\mathbb{R}$ is $\cdots\cdots$
18	**The solution set of the equation : $x^2 + 4 = 0$ in $\mathbb{R}$ is $\cdots\cdots$**
19	The solution set of the equation : $x^2 + 9 = 0$ in $\mathbb{Q}$ is $\cdots\cdots$
20	The S.S. of the equation : $x^2 + 25 = 0$ in $\mathbb{R}$ is $\cdots\cdots$
21	The solution set of the equation : $(x^2+3)(x^2+1) = 0$ where $x \in \mathbb{R}$ is $\cdots\cdots$
22	The S.S. of the equation : $(x^2-1)(x+5) = 0$ in $\mathbb{R}$ is $\cdots\cdots$
23	The S.S. of the equation : $(x^2+1)(x-5) = 0$ in $\mathbb{R}$ is $\cdots\cdots$
24	The S.S. of the equation : $x^3 + 1 = 2$ in $\mathbb{R}$ is $\cdots\cdots$
25	The S.S. of the equation : $x(x^3-1) = 0$ in $\mathbb{R}$ is $\cdots\cdots$
26	The S.S. of the equation : $(x^2+3)(x^3+1) = 0$ is $\cdots\cdots$
27	If : $x < -\sqrt{7} < x+1$, then $x = \cdots\cdots$ (where x is an integer)
28	If : $x < \sqrt{15} < x+1$, $x \in \mathbb{Z}$, then $x = \cdots\cdots$
29	If : $x < \sqrt{19} < x+1$, then $x = \cdots\cdots$
30	If $x < \sqrt{20} < x+1$, $x \in \mathbb{Z}$, then $x = \cdots\cdots$
31	If $x < \sqrt{10} < x+1$, $x \in \mathbb{Z}_+$, then $x = \cdots\cdots$
32	$\mathbb{Q} \cap \grave{\mathbb{Q}} = \cdots\cdots$
33	$\mathbb{Q} \cup \grave{\mathbb{Q}} = \cdots\cdots$
34	$\mathbb{R}_+ \cup \mathbb{R}_- = \cdots\cdots$
35	The multiplicative inverse of $\frac{\sqrt{5}}{10}$ is $\cdots\cdots$
36	The multiplicative inverse of the number : $(\sqrt{3}+\sqrt{2})$ is $\cdots\cdots$

37	$[1\,,3] \cup [2\,,5[=$ ....
38	$]1\,,3] \cup [2\,,5] =$ ....
39	$]-\infty,1] \cup [-4\,,\infty[=$ ....
40	$]3\,,5[\cup \{3\,,5\} =$ ....
41	$]-2\,,2] \cup \{-2\,,0\} =$ ....
42	$]5\,,7[\cup \{5\,,7\} =$ ....
43	$\mathbb{N} \cap]1\,,2[=$ ....
44	$]1\,,7[\cap]3\,,5[=$ ....
45	$[-3\,,1[\cap [-1\,,4[=$ ....
46	$[-2\,,5] \cap]4\,,6] =$ ....
47	$]-3\,,5] \cap [0\,,3[=$ ....
48	$[1\,,5] - \{1\,,5\} =$ ....
49	$[2\,,5] - \{5\} =$ ....
50	$[2\,,5] - \{2\,,5\} =$ ....

2 Choose the correct answer:

1	$\left(2\sqrt[3]{2}\right)^3 = \dots\dots\dots\dots$ (a) 4 (b) 8 (c) 16 (d) 40
2	📖 $\sqrt[3]{(-8)^2} = \dots\dots\dots\dots$ (a) 2 (b) -2 (c) 4 (d) -4
3	$\sqrt{8} - \sqrt{2} = \dots\dots\dots\dots$ (a) $\sqrt{6}$ (b) 2 (c) $\sqrt{2}$ (d) 1
4	$\sqrt{25} - \sqrt[3]{-125} = \dots\dots\dots\dots$ (a) 10 (b) zero (c) 5 (d) ± 5
5	$-2\sqrt{3} \times \sqrt{3} = \dots\dots\dots\dots$ (a) $-2\sqrt{3}$ (b) -6 (c) $2\sqrt{3}$ (d) 6
6	$\sqrt{3}\left(\sqrt{11} + \sqrt{3}\right) = \dots\dots\dots\dots$ (a) $3\sqrt{11} + 2$ (b) $\sqrt{33} + 3$ (c) $11\sqrt{3} + 2$ (d) $2\sqrt{11} + 3$
7	$\sqrt{9} + \sqrt[3]{-27} = \dots\dots\dots\dots$ (a) 0 (b) -6 (c) -9 (d) ± 6
8	$\sqrt[3]{-8} + \sqrt{4} = \dots\dots\dots\dots$ (a) 4 (b) -4 (c) zero (d) 8
9	$\sqrt{25} = \sqrt[3]{\dots\dots\dots\dots}$ (a) 5 (b) 15 (c) 125 (d) -5

10	If : $\sqrt[3]{y} = -\sqrt{9}$, then y = ... (a) 3 (b) – 3 (c) – 27 (d) 27
11	$\sqrt{25} + \sqrt[3]{-27} = \sqrt{\ldots\ldots\ldots\ldots}$ (a) 8 (b) 4 (c) 2 (d) 5
12	$\sqrt[3]{27} = \sqrt{x+3}$, then x = ... (a) 3 (b) 6 (c) 9 (d) 12
13	If $x^3 = 64$, then $\sqrt{x}$ = ... (a) 4 (b) – 4 (c) 2 (d) – 2
14	The solution set for the equation : $x^2 = 2$ in $\mathbb{R}$ is .... (a) $\{\sqrt{2}\}$ (b) $\{-\sqrt{2}\}$ (c) $\{\sqrt{2}, -\sqrt{2}\}$ (d) $\{2\}$
15	The S.S. of the equation : $x^2 + 3 = 0$ in $\mathbb{R}$ is .... (a) $\varnothing$ (b) $-\sqrt{3}$ (c) $\sqrt{3}$ (d) $\pm\sqrt{3}$
16	The S.S. of the equation : $x^2 + 5 = 9$ where $x \in \mathbb{Q}'$ is .... (a) $\{4\}$ (b) $\{-2, 2\}$ (c) $\varnothing$ (d) $\{13\}$
17	The S.S. of the equation : $x^3 + 8 = 0$ in $\mathbb{R}$ is .... (a) $\{2\}$ (b) $\{2\sqrt{2}\}$ (c) $\{-2\}$ (d) $\{2, -2\}$
18	The solution set for the equation : $x^3 + 9 = 8$ in $\mathbb{R}$ is .... (a) $\{8\}$ (b) $\{9\}$ (c) $\{3\}$ (d) $\{-1\}$
19	The S.S. of the equation : $x^3 + 27 = 0$ in $\mathbb{R}$ is .... (a) $\{3\}$ (b) $\{-3\}$ (c) $\{3\sqrt{3}\}$ (d) $\{\pm 3\sqrt{3}\}$
20	The S.S. in $\mathbb{R}$ of the equation : $x^3 + 11 = 12$ in $\mathbb{R}$ is .... (a) $\{11\}$ (b) $\{12\}$ (c) $\{1\}$ (d) $\{3\}$

21 If : $\frac{3}{a+2}$ is a rational number then $a \neq$ ....

(a) 3 (b) 5 (c) -2 (d) zero

22 If $n \in \mathbb{Z}_+$, $n < \sqrt{26} < n+1$, then $n =$ ....

(a) 25 (b) 5 (c) -5 (d) 24

23 The irrational number in the following numbers is ....

(a) $\sqrt{\frac{1}{9}}$ (b) $\sqrt{\frac{1}{4}}$ (c) $\sqrt{3}$ (d) $\sqrt[3]{27}$

24 The irrational number in the following numbers is ....

(a) $\sqrt{\frac{1}{4}}$ (b) $\sqrt[3]{8}$ (c) $\sqrt{\frac{4}{9}}$ (d) $\sqrt{2}$

25 The irrational number lies between 2 and 3 is ....

(a) $\sqrt{10}$ (b) $\sqrt{7}$ (c) 2.5 (d) $\sqrt{3}$

26 The irrational number lies between 3 and 4 is ....

(a) 3.5 (b) $\frac{1}{8}$ (c) $\sqrt{20}$ (d) $\sqrt{13}$

27 📖 The area of a square whose side length is $\sqrt{3}$ cm. = ... cm^2

(a) $4\sqrt{3}$ (b) 9 (c) 3 (d) 6

28 📖 The square whose area is 10 cm^2, its side length is .... cm.

(a) 5 (b) -5 (c) $\sqrt{10}$ (d) $-\sqrt{10}$

29 The multiplicative inverse of $\frac{\sqrt{3}}{3}$ is ....

(a) $\sqrt{3}$ (b) 1 (c) 3 (d) $-\sqrt{3}$

30	$\mathbb{Q} \cap \grave{\mathbb{Q}} =$ .... (a) $\{0\}$ (b) $\varnothing$ (c) $\mathbb{R}$ (d) $\mathbb{Q}$
31	If : $\sqrt[3]{y} = -\sqrt{9}$, then y = ... (a) 3 (b) – 3 (c) – 27 (d) 27
32	$\sqrt{25} + \sqrt[3]{-27} = \sqrt{\text{.............}}$ (a) 8 (b) 4 (c) 2 (d) 5
33	$\sqrt[3]{27} = \sqrt{x+3}$, then $x =$ .... (a) 3 (b) 6 (c) 9 (d) 12
34	The solution set for the equation : $x^2 = 2$ in $\mathbb{R}$ is .... (a) $\{\sqrt{2}\}$ (b) $\{-\sqrt{2}\}$ (c) $\{\sqrt{2}, -\sqrt{2}\}$ (d) $\{2\}$
35	$\sqrt[3]{-27} + 3 =$ .... (a) zero (b) 3 (c) 6 (d) – 24
36	If $x^3 = 64$, then $\sqrt{x} =$ .... (a) 4 (b) – 4 (c) 2 (d) – 2
37	If $x < \sqrt[3]{36} < x+1$, $x \in \mathbb{Z}$, then $x =$ .... (a) 2 (b) 3 (c) 4 (d) 6

38	$\sqrt[3]{8}$ .... $]-\infty , 4[$	(a) $\in$	(b) $\notin$	(c) $\subset$	(d) $\not\subset$
39	$5 \in$	(a) $]5 , \infty[$	(b) $]-\infty , 5[$	(c) $(3 , 5)$	(d) $[-5 , \infty[$
40	The opposite figure represents the interval .... 	(a) $[-4 , 8[$	(b) $[8 , -4]$	(c) $[-4 , 8]$	(d) $]-4 , 8[$
41	$\mathbb{R} =$	(a) $\mathbb{R}_+ \cap \mathbb{R}_-$	(b) $\mathbb{R}_+ \cup \mathbb{R}_-$	(c) $]-\infty , \infty[$	(d) $\mathbb{Q} \cap \grave{\mathbb{Q}}$
42	$\mathbb{R}_+ =$	(a) $]0 , \infty[$	(b) $]-\infty , 0[$	(c) $[0 , \infty[$	(d) $]-\infty , 0]$
43	$\mathbb{R}_- =$	(a) $]0 , \infty[$	(b) $]-\infty , 0[$	(c) $[0 , \infty[$	(d) $]-\infty , 0]$
44	The set of non-negative real numbers = ...	(a) $]0 , \infty[$	(b) $]-\infty , 0[$	(c) $[0 , \infty[$	(d) $]-\infty , 0]$
45	The set of non-positive real numbers = ...	(a) $]0 , \infty[$	(b) $]-\infty , 0[$	(c) $[0 , \infty[$	(d) $]-\infty , 0]$
46	$]-1 , 3] \cap [-3 , -1] =$	(a) $\varnothing$	(b) $\{-3\}$	(c) $\{-1\}$	(d) $\{3\}$
47	$[1 , 5] \cap]-2 , 3] =$	(a) $\{1 , 3\}$	(b) $]1 , 3[$	(c) $[1 , 3]$	(d) $[1 , 3[$
48	$]-3 , 5[\cap [0 , 3[=$	(a) $[0 , 3]$	(b) $[0 , 3[$	(c) $]-3 , 0[$	(d) $[3 , 5[$
49	$[2 , 7] - \{2 , 7\} =$	(a) $[1 , 6]$	(b) $\varnothing$	(c) $]2 , 7[$	(d) $\{0\}$
50	$[-2 , 5] - \{-2 , 6\} =$	(a) $]-2 , 5[$	(b) $]-2 , 6[$	(c) $]-2 , 5]$	(d) $[-2 , 5[$
51	$[-3 , 7] - \{-3 , 7\} =$	(a) $[-3 , 7[$	(b) $]-3 , 7]$	(c) $]-3 , 7[$	(d) $(0 , 0)$

3 Essay Problems :

1	Find the value of x in each of the following : 📖 $\sqrt[3]{x} = 5$
2	Find the value of x in each of the following : 📖 $x^3 = -8$
3	Find the S.S. of each of the following equations in $\mathbb{Q}$: 📖 $x^3 + 27 = 0$
4	Find the S.S. of each of the following equations in $\mathbb{Q}$: 📖 $8x^3 + 7 = 8$
5	Find the S.S. of each of the following equations in $\mathbb{Q}$: 📖 $(x + 3)^3 = 343$
6	Find the S.S. of each of the following equations in $\mathbb{Q}$: 📖 $(5x - 2)^3 + 10 = 18$
7	Find the edge length of a cube with volume = $15\frac{5}{8}$ cm³. «2.5 cm.»
8	📖 Find the inner edge length of a cube vessel with capacity of one litre. «10 cm.»
9	📖 Find the diameter length of a sphere whose volume = $\frac{1372}{81}\pi$ cube unit. «$\frac{14}{3}$ length unit»
10	Prove that : $\sqrt{2}$ is included between 1.4 and 1.5
11	Prove that : 📖 $\sqrt[3]{15}$ is included between 2.4 and 2.5
12	Determine the point that represents each of the following numbers on the number line : (1) $\sqrt{3}$ (2) $-\sqrt{11}$ (3) $\sqrt{10}$

13 **Arrange the following numbers descendingly :**

[1] $\sqrt{62}$, 8 , $-\sqrt{50}$ and $\sqrt{70}$

[2] $\sqrt{6}$, 9 , $-\sqrt{10}$, $-\sqrt{7}$, $-\sqrt{50}$ and $\sqrt{101}$

14 Find the value of X in each of the following cases and determine whether $X \in \mathbb{Q}$ or $X \in \mathbb{Q}'$:

[1] $5X^2 = 10$

[2] $4X^2 = 9$

[3] $X^3 = 125$

[4] $(X-1)^2 = 4$

15 If $X = [-1, 4]$, $Y = [3, \infty[$, $Z = \{3, 4\}$, find using the number line

(1) $X \cup Y$ (2) $X \cap Y$ (3) $X - Z$

16 If $A =]-\infty, 3[$, $B = [-2, 5]$

, **find using the number line :** $B - A$, $A \cap B$, $A \cup B$ and A'

17 If $X = [3, \infty[$, $Y =]-4, 8[$

Find : (1) $X \cup Y$ (2) $X \cap Y$ (3) X'

18 If $X = [-1, 4]$ and $Y = [2, 7]$, then find each of :

(1) $X \cap Y$ (2) $Y \cup X$

19 If $X = [-2, 1]$, $Y = [0, \infty[$

Find : (1) $X \cap Y$ (2) $X \cup Y$ (3) $Y - X$

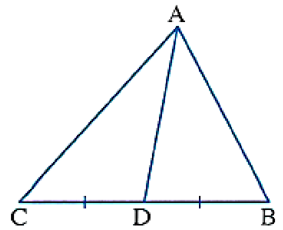
20 If $X = [-1, 4]$, $Y = [3, \infty[$, find using the number line each of :

(1) $X \cup Y$ (2) $X - Y$

SUMMARY OF ALL LESSONS

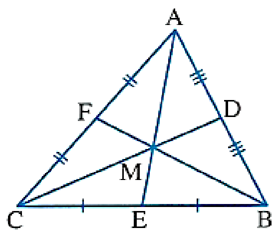
Medians of triangle

The median of the triangle is the line segment drawn from any vertex of the triangle vertices to the midpoint of the opposite side of this vertex.



If D is the midpoint of $\overline{BC}$, then $\overline{AD}$ is a median in ΔABC

The medians of a triangle are concurrent.

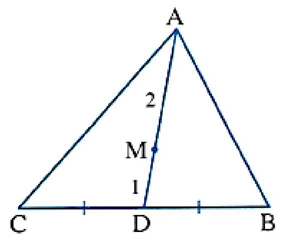


If $\overline{CD}$, $\overline{BF}$ and $\overline{AE}$ are the medians of ΔABC where $\overline{CD} \cap \overline{BF} \cap \overline{AE} = \{M\}$

, then M is the intersection point of the medians of ΔABC

The point of concurrence of the medians of the triangle divides each median in the ratio of :

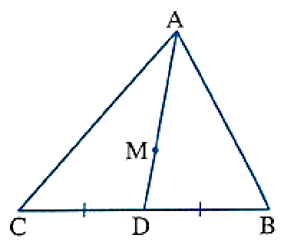
- 1 : 2 from the base.
- 2 : 1 from the vertex.



If M is the intersection point of the medians of ΔABC , then :

- $DM = \frac{1}{2} AM$
- $AM = 2 DM$
- $DM = \frac{1}{3} AD$
- $AM = \frac{2}{3} AD$

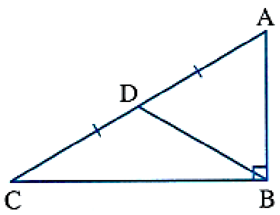
The point which divides the median of a triangle by the ratio 1 : 2 from the base is the point of the intersection of the medians of the triangle.



If $DM : MA = 1 : 2$, then M is the intersection point of the medians of ΔABC

Right-angled triangle

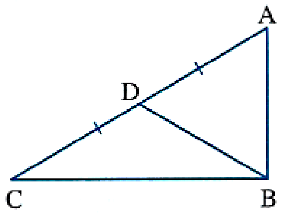
The length of the median from the vertex of the right angle equals half the length of the hypotenuse.



If ΔABC is right-angled at B, $\overline{BD}$ is a median in it, then

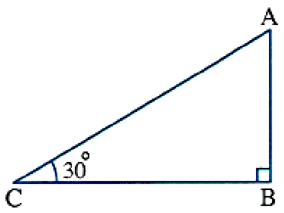
$BD = \frac{1}{2} AC$

If the length of the median drawn from a vertex of a triangle equals half the length of the opposite side to this vertex, then the angle at this vertex is right.



If $\overline{BD}$ is a median of ΔABC, $BD = \frac{1}{2} AC$, then $m(\angle ABC) = 90°$

The length of the side opposite to the angle of measure 30° in the right-angled triangle equals half the length of the hypotenuse.

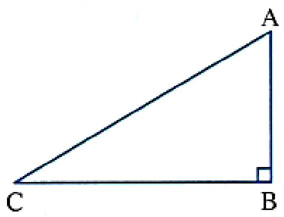


If ΔABC is right-angled at B in which :

$m(\angle C) = 30°$

, then $AB = \frac{1}{2} AC$

In the right-angled triangle, the hypotenuse is the longest side of the triangle.

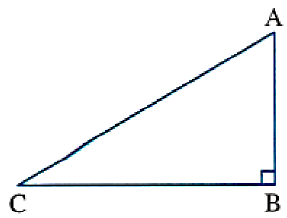


If ΔABC is right-angled at B, then

$AC > AB$, $AC > BC$

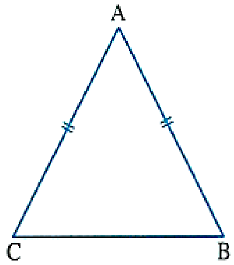
If ΔABC is right-angled at B, then :

- $(AC)^2 = (AB)^2 + (BC)^2$
- $(AB)^2 = (AC)^2 - (BC)^2$
- $(BC)^2 = (AC)^2 - (AB)^2$



The isosceles triangle

The base angles of the isosceles triangle are congruent.

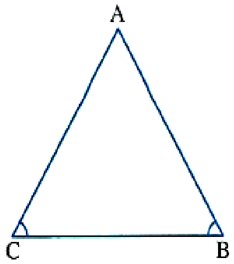


If Δ ABC in which :

AB = AC , then

m ($\angle$ B) = m ($\angle$ C)

If two angles of a triangle are congruent , then the two sides opposite to these two angles are congruent and the triangle is isosceles.



If Δ ABC in which :

m ($\angle$ B) = m ($\angle$ C)

, then AB = AC

1 Complete the Following :

1 In ΔABC : if the point X is the midpoint of $\overline{BC}$, then $\overline{AX}$ is called ....

2 The medians of the triangle are ....

3 The medians of the triangle intersect at ....

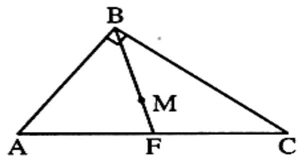
4 The point of intersection of the medians of a triangle divides each median in the ratio .... from the vertex.

5 The points of concurrence of the medians of the triangle divides each median in the ratio .... : .... from the base.

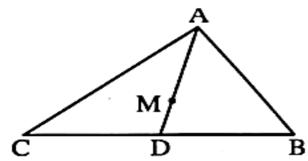
6 The point of intersection of the medians of the triangle divides each of them by the ratio 1 : 2 from ....

7 The point which divides the median of the triangle in the ratio 1 : 2 from the base is the point of ....

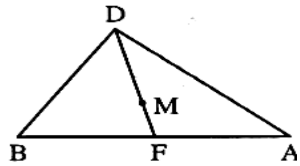
8 **In the opposite figure :**
If M is intersection point of medians
and m ($\angle$ B) = 90° , MF = 1.5 cm.
, then the length of $\overline{AC}$ = ...



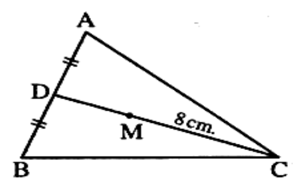
9 **In the opposite figure :**
If M is the point of intersection of
the medians of ΔABC , then AM = ... AD



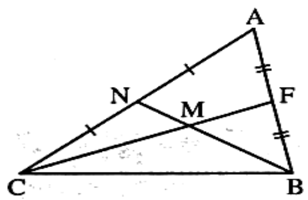
10 **In the opposite figure :**
If : MF = 2 cm., then DF = ...



11 **In the opposite figure :**
In ΔABC , M is the point of concurrence of the medians
, MC = 8 cm.
, then DM = ... cm.



12 **In the opposite figure :**
If : F and N are the midpoints of $\overline{AB}$, $\overline{AC}$
Respectively , $\overline{BN} \cap \overline{CF} = \{m\}$, AB = 6 cm.
, AC = 10 cm. , BM = 4 cm. , CF = 9 cm.
Find the perimeter of figure : AFMN



13	In the right-angled triangle the length of the median from the vertex of the right angle equal ………. the length of the hypotenuse.
14	In the right-angled triangle , the length of the median from the vertex of the right angle equals ……….
15	If the length of the median drawn from a vertex of a triangle equals half the length of the opposite side to this vertex in length , then ……….
16	The length of the side opposite to the angle of measure 30° in the right-angled triangle equals ………. the length of the hypotenuse.
17	The length of side opposite to the angle whose measure = 30° in the right-angled triangle = ……….
18	The length of the hypotenuse on the right-angled triangle equals ………. the length of a side opposite to the angle of measure 30°
19	In Δ LMN : If m ($\angle$ L) = 30° , m ($\angle$ N) = 60° , NM = 4 cm. , then LN = ……… cm.
20	If ABC is a right-angled triangle at B , AB = 6 cm. , BC = 8 cm. , if $\overline{BD}$ is a median of triangle ABC , then BD = ………. cm.
21	In Δ ABC , m ($\angle$ C) = 60° , m ($\angle$ B) = 90° , AC = 8 cm. , then BC = …………… cm.
22	In Δ ABC if m ($\angle$ A) = 30° and m ($\angle$ B) = 90° , then BC = ………. AC
23	If ABC : Is a right-angled at B , AB = $\frac{1}{2}$ AC , then m ($\angle$ C) = ……….
24	If ABC is a right-angled triangle at B and AB = $\frac{1}{2}$ AC , then m ($\angle$ A) = ……….
25	ABC is a right-angled triangle at B , if AC = 2 BC , then m ($\angle$ C) = ……………°

26	The two base angles in an isosceles triangle are …………
27	Δ ABC , AB = AC , m ($\angle$ C) = 70° , then m ($\angle$ A) = …………
28	In the Δ ABC : AB = AC , m ($\angle$ A) = 70° , then m ($\angle$ C) = …………°
29	The Δ ABC is an isosceles and right-angled triangle if m ($\angle$ B) = 90° , then m ($\angle$ A) = m ($\angle$ C) = ……………°
30	In Δ ABC , if AB = AC and m ($\angle$ A) = 80° , then m ($\angle$ B) = m ($\angle$ ……………) = ………°
31	In Δ ABC : if AB = AC , m ($\angle$ B) = 60° , then the triangle is an …………
32	In Δ ABC : If AB = AC and m ($\angle$ A) = 2 m ($\angle$ C) , then m ($\angle$ B) = ………… °
33	The triangle whose side lengths 3 cm. , (X + 1) , and 6 cm. become isosceles triangle when X = …………
34	The length of side opposite to the angle whose measure = 30° in the right-angled triangle = …………
35	The length of the hypotenuse on the right-angled triangle equals ………… the length of a side opposite to the angle of measure 30°
36	In Δ LMN : If m ($\angle$ L) = 30° , m ($\angle$ N) = 60° , NM = 4 cm. , then LN = ……… cm.
37	If ABC is a right-angled triangle at B , AB = 6 cm. , BC = 8 cm. , if $\overline{BD}$ is a median of triangle ABC , then BD = ………… cm.
38	In Δ ABC , m ($\angle$ C) = 60° , m ($\angle$ B) = 90° , AC = 8 cm. , then BC = …………… cm.
39	In Δ ABC if m ($\angle$ A) = 30° and m ($\angle$ B) = 90° , then BC = ………… AC
40	If ABC : Is a right-angled at B , AB = $\frac{1}{2}$ AC , then m ($\angle$ C) = …………

2 Choose the correct answer:

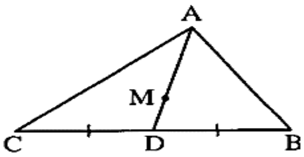
1	The medians of the triangle intersect at ·········· point. (a) 1 (b) 2 (c) 3 (d) 4
2	The right-angled triangle has ·········· medians. (a) 0 (b) 1 (c) 2 (d) 3
3	The number of medians in the right-angled triangle = ··············· (a) 3 (b) 2 (c) 1 (d) 0
4	The point of intersection of the medians in the triangle divides each of them by the ratio ·········· from the vertex. (a) 1 : 3 (b) 3 : 1 (c) 2 : 1 (d) 1 : 2
5	The point of concurrence of the medians of the triangle divides each median in the ratio of ·········· from the base. (a) 1 : 2 (b) 1 : 3 (c) 2 : 1 (d) 3 : 1
6	If $\overline{AD}$ is a median of triangle ABC , and M is the point of intersection of the medians , then AM = ·········· AD (a) $\frac{1}{3}$ (b) $\frac{2}{3}$ (c) $\frac{1}{2}$ (d) $\frac{1}{4}$
7	$\overline{AD}$ is a median in Δ ABC , M is the point of intersection of its medians , then AM = ·········· MD (a) 2 (b) $\frac{1}{2}$ (c) 3 (d) $\frac{1}{3}$
8	If $\overline{XE}$ is a median in Δ XYZ , M is the point of intersection of its medians , then EM = ·········· XE (a) $\frac{1}{2}$ (b) 2 (c) $\frac{1}{3}$ (d) $\frac{2}{3}$
9	In Δ ABC : If AD = 6 cm. is a median and M is a point of concurrent , then MA = ·········· cm. (a) 6 cm. (b) 3 cm. (c) 2 cm. (d) 4 cm.

10 If $\overline{AD}$ is a median of ΔABC , M is the point of intersection of its medians and AM = 6 cm. , then AD = ...

(a) 12 cm. (b) 6 cm. (c) 18 cm. (d) 9 cm.

11 **oose the correct answer :**

In the opposite figure :



$\overline{AD}$ is a median in ΔABC , M is the point of intersection of the medians , MD = 2 cm. , then AD = ... cm.

(a) 2 (b) 4 (c) 6 (d) 8

12 The length of the hypotenous of the right-angled triangle = ... the length of the median which drawn from the vertex of the right-angle.

(a) half (b) twice (c) third (d) quarter

13 The length of the median drawn from the vertex of right angle in the right-angled triangle = ... the length of the hypotenuse of the triangle.

(a) 2 (b) $\frac{1}{3}$ (c) $\frac{1}{2}$ (d) $\frac{1}{4}$

14 In the right-angled triangle , the length of the median from the vertex of the right angle equal .... the length of the hypotenuse.

(a) $\frac{1}{3}$ (b) $\frac{1}{2}$ (c) $\frac{1}{4}$ (d) 2

15 In the right-angled triangle , the length of the median from the vertex of the right angle equals .... the length of hypotenuse.

(a) half (b) twice (c) third (d) forth

16 If ΔABC is a right-angled at B , AB = 6 cm. , BC = 8 cm. , then the length of the medians drawn from B is .... cm.

(a) 10 (b) 8 (c) 6 (d) 5

17 In ΔABC which is right at B , if AC = 20 cm. , then the length of the median of the triangle drawn from B equals ....

(a) 10 cm. (b) 8 cm. (c) 6 cm. (d) 5 cm.

18 In ΔABC , $m(\angle B) = 90°$, AC = 12 cm. and $\overline{BD}$ is a median in ΔABC , then BD = ... cm.

(a) 12 (b) 6 (c) 24 (d) 10

19 The length of the side opposite to the angle of measure 30° in the right-angled .... the length of the hypotenuse.

(a) twice (b) half (c) square (d) equals

20 Triangle ABC : If $m(\angle A) = 30°$, $m(\angle B) = 90°$, then BC = ...

(a) $\frac{1}{2}$ AB (b) $\frac{1}{2}$ AC (c) 2 AB (d) 2 AC

21 In ΔABC if : $m(\angle B) = 90°$ and $m(\angle A) = 60°$, then AC = ... AB

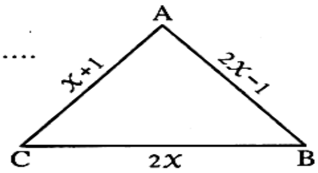
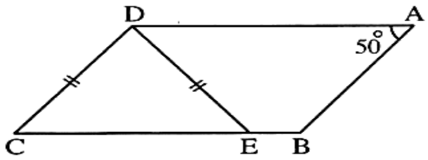
(a) 2 (b) = (c) $\frac{1}{2}$ (d) $\frac{1}{3}$

22 ΔABC : if $m(\angle A) = 30°$ and $m(\angle B) = 90°$, then AC = ...

(a) $\frac{1}{2}$ BC (b) 2 BC (c) 2 AB (d) BC

23	In Δ ABC : m ($\angle$ A) = 30° , m ($\angle$ B) = 90° , AC = 10 cm. , then BC = ... cm. (a) 20 (b) 15 (c) 10 (d) 5
24	In Δ XYZ , if m ($\angle$ Y) = 90° , m ($\angle$ X) = 30° and XZ = 20 cm. , then ZY = ... cm. (a) 5 (b) 8 (c) 20 (d) 10
25	In the rectangle ACBD , if AC = 10 cm. , then BD = ... (a) 5 (b) 10 (c) 15 (d) 20

26	In any isosceles triangle , the type of the base angles is ……… (a) acute. (b) right. (c) obtuse. (d) reflex.
27	The base angles of the isosceles triangle are …………… (a) congruent. (b) alternate. (c) corresponding. (d) supplementary.
28	If measure of one of the two base angles of the isosceles triangle equals 40° then the measure of the vertex angle = ……………° (a) 40 (b) 100 (c) 80 (d) 50
29	In ΔABC : $AB = AC$, $m(\angle B) = 50°$, then $m(\angle A) =$ ……………° (a) 65 (b) 80 (c) 50 (d) 100
30	An isosceles triangle , one of its base angles has measure 50° , then the measure of the vertex angle = ……… (a) 50° (b) 60° (c) 70° (d) 80°
31	In the isosceles triangle , if the measure of one of the two base angle is 70° , then the measure of its vertex angle is ……… (a) 70° (b) 110° (c) 20° (d) 40°
32	The measure of one angle of the two base angles of the isosceles = 75° , then the measure of the vertex angle = ……… (a) 50° (b) 75° (c) 30° (d) 105°
33	In a triangle ABC : If $AB = AC$ and $m(\angle A) = 40°$, then $m(\angle C) =$ ……… (a) 40° (b) 70° (c) 140° (d) 50°
34	In ΔABC , $AB = AC$, $m(\angle A) = 50°$, then $m(\angle B) =$ ……… (a) 50° (b) 65° (c) 130° (d) 100°
35	If the measure of an angle of the isosceles triangle is 100° , then the measure of one of the other angles = ……… (a) 50° (b) 80° (c) 40° (d) 100°
36	ΔXYZ is an isosceles triangle in which $m(\angle X) = 100°$, then $m(\angle Y) =$ ………° (a) 100 (b) 80 (c) 60 (d) 40
37	ABC is a triangle in which $AB = AC$ and $m(\angle A) = 110°$, then $m(\angle B) =$ ……… (a) 70° (b) 55° (c) 35° (d) 110°
38	If the measure of an angle of the isosceles triangles is 120° , then the measure of one of the other angles = ……… (a) 60° (b) 30° (c) 40° (d) 45°
39	ABC is isosceles triangle $m(\angle C) = 130°$, then $m(\angle B) =$ ……………° (a) 130 (b) 50 (c) 25 (d) 60

40	The triangle whose sides lengths are 2 cm. , $(X + 1)$ cm and 5 cm. becomes an isosceles triangle when $X =$ ……… cm. (a) 1 (b) 2 (c) 3 (d) 4	
41	The triangle whose sides lengths are 3 cm. , $(X + 5)$ and 9 becomes an isosceles if $X =$ ……… cm. (a) 3 (b) 4 (c) 5 (d) 6	
42	Triangle whose sides lengths are 2 cm. , $(X - 2)$ cm. , 5 cm. becomes isosceles triangle when $X =$ ……… cm. (a) 3 (b) 4 (c) 5 (d) 7	
43	**In the opposite figure :** ABC is a triangle in which : m (∠ B) = m (∠ C) , then $X =$ ……… (a) 1 (b) 2 (c) 3 (d) 4	
44	ABCD is a parallelogram : DE = DC , m (∠ A) = 50° , then m (∠ EDC) = ……… (a) 50° (b) 60° (c) 70° (d) 80°	

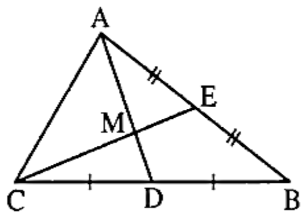
3 Essay Problems :

1 **In the opposite figure :**

E is the midpoint of $\overline{AB}$, D is the midpoint of $\overline{BC}$

$\overline{AD} \cap \overline{CE} = \{M\}$, MC = 5 cm. and MD = 2 cm.

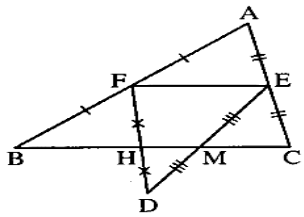
Find : The length of each of $\overline{AD}$ and $\overline{ME}$.



2 **In the opposite figure :**

F , E , M and H are the midpoints of $\overline{AB}$, $\overline{AC}$, $\overline{ED}$ and $\overline{FD}$ respectively.

Prove that : BC = 4 HM

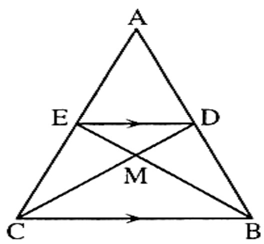


3 **In the opposite figure :**

ABC is a triangle in which $\overline{CD}$, $\overline{BE}$ two medians intersects at M ,

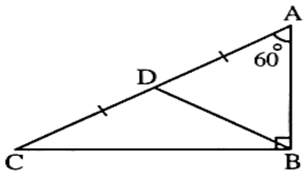
if : DC = 9 cm. , BM = 4 cm. , BC = 8 cm.

Find : The perimeter of Δ MDE



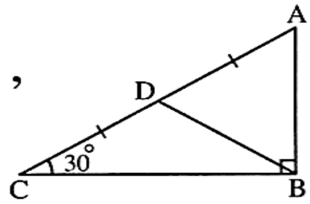
4

In the opposite figure : ΔABC , $AC = 8$ cm. ,
$m(\angle BAC) = 60°$, $m(\angle ABC) = 90°$,
D is the midpoint of $\overline{AC}$
Find : The perimeter of ΔABD



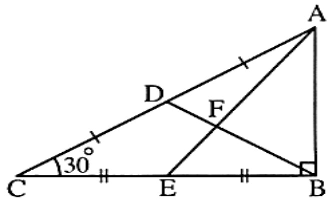
5

In the opposite figure :
$m(\angle B) = 90°$, $m(\angle C) = 30°$, $\overline{BD}$ is a median , $AB = 4$ cm. ,
Complete :
AC = ……… cm. , BD = ……… cm. , AD = ……… cm.



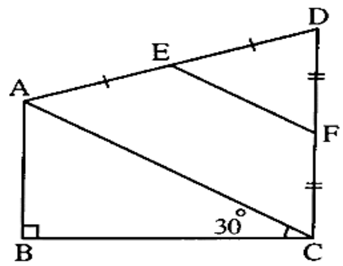
6

In the opposite figure :
ΔABC in which $m(\angle B) = 90°$, $AC = 10$ cm. ,
$m(\angle C) = 30°$, $EC = EB$, $AD = DC$
Find with proof : ❶ The perimeter of ΔABD
❷ The length of $\overline{DF}$



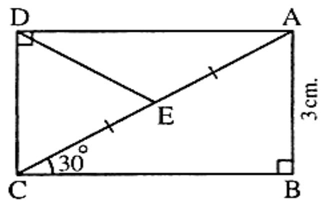
7

In the opposite figure :
$m(\angle B) = 90°$,
$m(\angle ACB) = 30°$,
E , F are midpoints of $\overline{AD}$, $\overline{DC}$
Prove that : $AB = EF$



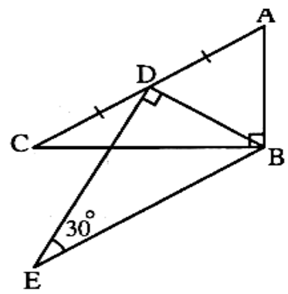
8

In the opposite figure :
$m(\angle ABC) = m(\angle ADC) = 90°$,
$m(\angle ACB) = 30°$, and $\overline{DE}$ is a median of ΔADC ,
If $AB = 3$ cm.
Find : The length of $\overline{DE}$



9

In the opposite figure :
$m(\angle ABC) = m(\angle BDE) = 90°$
, $m(\angle E) = 30°$
, D is the midpoint of $\overline{AC}$
Prove that : $AC = BE$



10

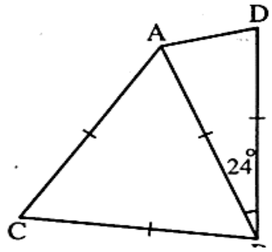
In the opposite figure :

ACBD is a quadrilateral in which :

AB = BC = CA = BD

, m (∠ ABD) = 24°

Find : m (∠ CAD)



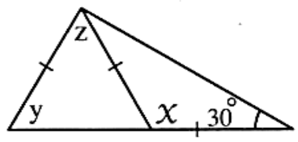
11

In the opposite figure complete :

x = ……… ° ,

y = ……… ° ,

z = ……… °



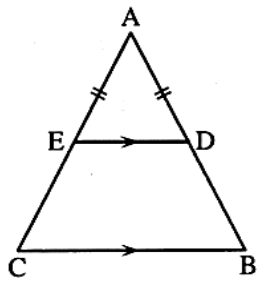
12

In the opposite figure :

$\overline{DE}$ // $\overline{BC}$

, AD = AE

Prove that : AB = AC



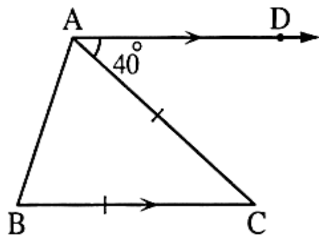
13

In the opposite figure :

ABC is a triangle ,

AC = BC , $\overrightarrow{AD}$ // $\overline{BC}$, m (∠ DAC) = 40°

Find : The measure of angles in the Δ ABC



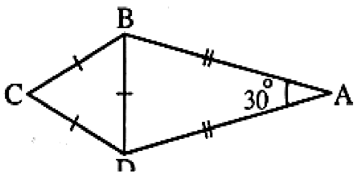
14

In the opposite figure :

AB = AD , m (∠ A) = 30° ,

CB = BD = CD

Find : m (∠ CBA)

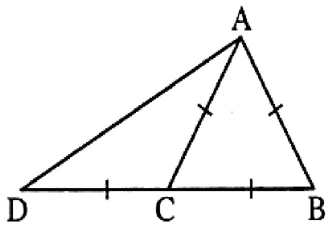


15

In the opposite figure :

AB = BC = AC = DC

Prove that : m (∠ BAD) = 90°



1	$\sqrt[3]{x^6} = \sqrt{\dots\dots}$ $\quad$ (x^3 , x^2 , x , x^4)
2	The $S.S$ of the equation : $x(x^2-1)=0$ in R is ………… $\quad$ ($\{0\}$, $\{1\}$, $\{-1\}$, $\{0,-1,1\}$)
3	$\mathbb{R} =$ ……….. $\quad$ ($\mathbb{Q} \cap \mathbb{Q}^{`}$ , $\mathbb{R}_+ \cup \mathbb{R}_-$ , $\mathbb{R}_+ \cap \mathbb{R}_-$ , $\mathbb{Q} \cup \mathbb{Q}^{`}$)
4	*The S.S of the equation* $x^2 - 9 = 0$ *in* $\mathbb{R}$ *is* ………. $\quad$ (3 , -3 , ± 3 , $\emptyset$)
5	$\mathbb{R}_+ \cup \mathbb{R}_- =$ ………….. $\quad$ ($\emptyset$, $\{0\}$, $\mathbb{R}$, $\mathbb{R} - \{0\}$)
6	*The irrational number located between 2 and 3 is* ……….. $\quad$ ($\sqrt{10}$, $\sqrt{7}$, 2.5 , $\sqrt{3}$)
7	*The irrational number located between 3 and 4 is* ……….. $\quad$ ($\sqrt{6}$, $\sqrt{17}$, 3.5 , $\sqrt[3]{29}$)
8	$\sqrt{x^4} = \sqrt[3]{\dots\dots}$ $\quad$ (x^6 , x^4 , x^2 , x)
9	*The volume of sphere whose diameter length is 6 cm* = …………… cm^3 $\quad$ (9π , 12π , 36π , 288π)
10	*if* $x < \sqrt{51} < x+1$, $x \in Z$, *then* $x =$ ………… $\quad$ (8 , 7 , 6 , 5)
11	*if* π *is the ratio between the circumference of the circle and its diameter length ,then* $\pi \in$ …………. $\quad$ ($\mathbb{Z}$, $\mathbb{N}$, $\mathbb{Q}$, $\mathbb{Q}^{`}$)
12	*The S.S in* $\mathbb{R}$ *for the equation :* $x^3 + 8 = 0$ *is* …………. $\quad$ ($\{4\}$, $\{2\}$, $\emptyset$, $\{-2\}$)
13	$\{x : x \in \mathbb{R}, x > 0\} =$ ……….. $\quad$ ($\mathbb{R}_-$, $\mathbb{R}$, $\mathbb{R}_+$, $\mathbb{Q}$)
14	*The cube whose volume is* $216\ cm^3$ *,then the area of one of its face* = ………… cm^2 $\quad$ (6 , 36 , 72 , 216)
15	$\sqrt[3]{9}$ ………. $\sqrt{4}$ $\quad$ ($<$, $>$, $=$, $\leq$)

16	The $S.S$ of the equation $x^2 + 36 = 0$ in $\mathbb{R}$ is .... ($\{6\}$, $\{-6\}$, $\{6, -6\}$, $\emptyset$)
17	$if\ \frac{x}{4} = \frac{16}{x^2}$, $then\ x$ = ... (2 , 4 , 8 , 16)
18	if the $volume$ of a $cube$ is $64\ cm^3$, $then$ the $length$ of its $edge$ $=$ .... cm (8 , 4 , 16 , 64)
19	$(2 - \pi)$ .... $\sqrt{(2-\pi)^2}$ ($<$, $>$, $=$, $\leq$)
20	if the $radius$ $length$ of a $sphere$ is $6\ cm$, $then$ its $volume$ is .... cm^3 (6π, 36π , 72π, 288π)
21	$if\ \sqrt[3]{x} = \sqrt{16}$, $then\ x =$ .... (4 , -4 , 64 , -64)
22	$\mathbb{Q} \cap \mathbb{Q}'$ = ... ($\mathbb{Q}$, $\mathbb{R}$, $\emptyset$, $\mathbb{Q}'$)
23	$\{x : x \in \mathbb{R}, x \leq 0\} =$ .... ($\mathbb{R}_-$, $\mathbb{R}$, $\mathbb{R}_+$, $\mathbb{R}_- \cup \{0\}$)
24	The $irrational$ $number$ in the $following$ is .... ($\sqrt{\frac{1}{4}}$, $\sqrt{\frac{4}{9}}$, $\sqrt{2}$, $\sqrt[3]{8}$)

1	The $cube$ $whose$ $volume$ is $8\ cm^3$, $then$ the sum of the $lengths$ of its $edges =$ ....
2	$if\ \sqrt[3]{x} = -5$, $then\ x =$ ....
3	$if\ x < \sqrt{51} < x + 1$, $x \in Z$, $then\ x =$ ....
4	if the $volume$ of a $sphere$ $= \frac{9}{16}\pi$, $then$ its $radius =$ .... cm
5	$\sqrt[3]{\dots\dots} = -\sqrt{4}$
6	$if\ x < \sqrt{19} < x + 1$, $x \in \mathbb{Z}$, $then\ x =$ ....
7	The $S.S$ of the equation : $(x^2 + 3)(x^3 + 1) = 0$ is .... , $x \in \mathbb{R}$

8	$\mathbb{R}_+ \cup \mathbb{R}_-$ = ………..
9	*The S.S of the equation* $x^2 - 5 = 0$ *is* ……………. *where* $x \in \mathbb{R}$
10	*The two consecutive integers which include the number* $\sqrt{5}$ *between them are* …………. *and* …………
11	*A square ,its area* $50\ cm^2$ *,then length of its diagonal* = …………………
12	*if the volume of a cube* $= 64\ cm^3$ *,then its lateral area* = …………. cm^2
13	$\sqrt[3]{27\ a^{12}}$ = …………
14	*if* $x \in \mathbb{Z}$ *and* $x < \sqrt[3]{29} < x + 1$ *, then* x = ……….
15	*The S.S of* $x^3 + 9 = 0$ *in* $\mathbb{R}$ *is* …………….
16	$R \cap R_-$ = ……………
17	*A cube of edge length 3 cm ,then its volume* = …………. cm^3
19	The *S.S of the equation* : $(x - \sqrt{5})(x + \sqrt{3}) = 0$ in $\mathbb{Q}$` *is* ………..
20	*if* $8 = \sqrt[3]{x}$ *, then* x = ……………
21	$\mathbb{R} - \mathbb{Q}$ = …………
22	$\sqrt[3]{125} = \sqrt{\ldots\ldots}$
23	$\mathbb{R} - \mathbb{R}_-$ = …………
24	*The volume of a cube is* $27\ cm^3$ *,then the area of one of its faces is* ……………. *cm*
25	$\mathbb{R}$ = ………. $\cup$ ………… $\cup$ …………

1	*Find the S.S in* $\mathbb{R}$: $2x^3 - 1 = 53$ ....
2	*Find the S.S in* $\mathbb{R}$: $8x^3 + 7 = 8$ ....
3	*Find the S.S in* $\mathbb{R}$: $(5x - 3)^3 = 8$ ....
4	*Find the S.S in* $\mathbb{R}$: $(x - 3)^3 = 5$ ....
5	*Find the S.S in* $\mathbb{R}$: $2x^2 - 6 = 4$ ....
6	*Prove that* : $\sqrt{5}$ *is included between* 2.2 *and* 2.3 ....
7	*Prove that* : $\sqrt[3]{15}$ *is included between* 2.4 *and* 2.5 ....
8	*Determine the point which represent the number* $\sqrt{5}$ *on the number line*

1	$in\ triangle\ ABC, if\ m(\angle C) = 60, m(\angle B) = 90, then\ AC =$ …….. ($2\,BC$, $2\,AB$, $\frac{1}{2}\,AB$, $\frac{1}{2}\,AB$)
2	$in\ \Delta\ ABC$, if $AB \perp BC$ and $AB = BC$, $then\ m(\angle A) =$ ……………° (30 , 45 , 60 , 90)
3	$if\ AD\ is\ a\ median\ of\ \Delta\ ABC$, and M is the point of concurrence of the median , then $AD =$ …………… AM ($\frac{1}{3}$, $\frac{2}{3}$, $\frac{1}{2}$, $\frac{3}{2}$)
4	$In\ a\ triangle\ ABC\ if\ AC = BC\ and\ m(\angle C) = 80, then\ m(\angle A) =$ ……….. (80 , 50 , 100 , 40)
5	$The\ measure\ of\ any\ exterior\ angle\ of\ an\ equilateral\ triangle =$ ………. (45 , 60 , 90 , 120)
6	If M is the point of intersection of the medians of $\Delta\ ABC$ and D is the midpoint of BC , then $AD =$ …………. ($2\,AM$, $3\,MD$, $\frac{2}{3}\,MD$, AM)
7	The point of intersection of the medians of the triangle divides each median in the ratio of ………… from the vertex (2 : 1 , 2 : 3 , 1 : 2 , 1 : 3)
8	$if\ \Delta\ ABC\ is\ a\ right\ angled\ at\ A$ and $AB = AC$, then $m(\angle B) =$ ……………° (30 , 45 , 60 , 90)
9	$ABC\ is\ an\ isosceles\ triangle, m(\angle A) = 100, then\ m(\angle B) =$ ……… (40 , 50 , 80 , 100)
10	$if\ AD\ is\ a\ median\ of\ \Delta\ ABC$ and M is the point of concurrence of the medians , then $AM =$ ………… AD ($\frac{2}{3}$, $\frac{1}{2}$, $\frac{3}{2}$, 2)
11	In any isosceles triangle , the type of the base angles is ……………. (acute , right , obtuse , reflex)

12	*if the measure of the vertex of angle of an isosceles triangle is 50, then the measure of one of its base angle is ....* (65 , 45 , 55 , 70)
13	$in\ \Delta\ ABC : if\ m(\angle B) = 90\ , AB = \frac{1}{2}\ AC\ , then\ m(\angle C) =$ .... (60 , 30 , 180 , 45)
14	The medians of the triangle intersect at .... (4 points , 3 points , 2 points , a point)
15	$if\ \Delta\ ABC$ is an equilateral triangle, then $m(\angle B)$ = ...$^\circ$ (30 , 60 , 70 , 90)
16	*The number of medians of the right angled triangle = ...* (*one* , *two* , *three* , *four*)

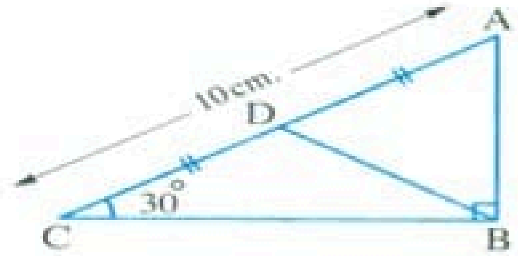
1	The point of intersection of the medians of the triangle divides each of them in the ratio .... : 5 from the vertex
2	If the length of the median drawn from a vertex of a triangle equals half the opposite side to this vertex in length, then ....
3	$in\ \Delta\ ABC\ , AB = AC\ , m(\angle B) = x + 30^\circ\ , m(\angle C) = 2x + 5^\circ$, then $x =$ ....
4	$in\ \Delta\ ABC$, if D is the midpoint of BC and $AD = \frac{1}{2}\ BC$, then $m(\angle A) =$ ....
5	*The base angles of the isosceles triangle are ....*
6	ABC is aright angled triangle at B , $m(\angle C) = 30^\circ\ , AB = 5\ cm$,then $AC =$ ....
7	*In the right angled triangle the length of the median drawn from the vertex of the right angle = ...*

8	$in\ \Delta\ ABC$, if $m\ (\angle A\ ) = 30^{\circ}$, $\mathrm{m}(\ \angle \mathrm{B}\ ) = 90^{\circ}$, then $AC =$ .... BC
9	$The\ medians\ of\ triangle\ are$ ....
10	$in\ \Delta\ ABC$ if the point X $is\ the\ midpoint\ of\ BC$, then AX $is\ called$ ....
11	The length of the side which is opposite to the angle of measure 30° in the right angled triangle equals .... the length of the hypotenuse
12	ABC is a triangle in which $AB = AC$ and $m\ (\angle A\ ) = 60^{\circ}$, if its perimeter = 18 cm , then BC = ... $cm.$
13	If the measure of one of the base angles of an isosceles triangle equals 50° , then the measure of the vertex angle equals ....
14	If the angles of a triangle are congruent , then the triangle is ....
15	$in\ \Delta\ ABC$, if $AB = AC$,$m(\angle A\ ) = 70^{\circ}$, so $m(\angle C\ ) =$ ....
16	The point of concurrence of the medians of the triangle divides each median in the ratio of .... from the base
17	$if\ \Delta\ ABC$ is a right angled triangle at B , $m(\angle A\ ) = 30^{\circ}$,$\mathrm{AC} = 10$ cm. , then $CB =$ .... $Cm.$
18	The length of the median of the right angled triangle drawn from the vertex of the right angle equals .... The length of the hypotenuse
19	$in\ \Delta\ ABC$, if the point D is the midpoint of AB and the point E is the midpoint of AC , then $DE =$ .... BC
20	$in\ \Delta\ DEF\ ,if\ DE = DF$, then $m(\angle E\ ) = m(\angle\ ...\ ...\ )$
21	$The\ base\ angles\ of\ an\ isosceles\ triangle\ are$ ....

1 m (∠ ABC) = 90° , m (∠ C) = 30°

, AD = DC and AC = 10 cm.

Find : The perimeter of Δ ABD

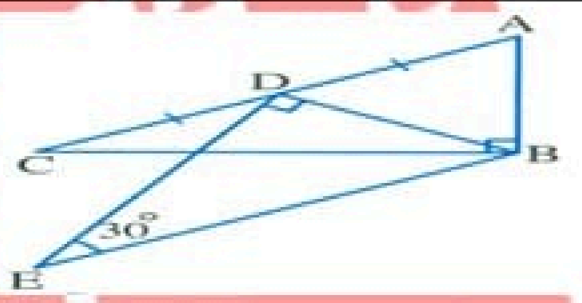


2 m (∠ ABC) = m (∠ BDE) = 90°

, m (∠ E) = 30°

, D is the midpoint of $\overline{AC}$

Prove that : AC = BE

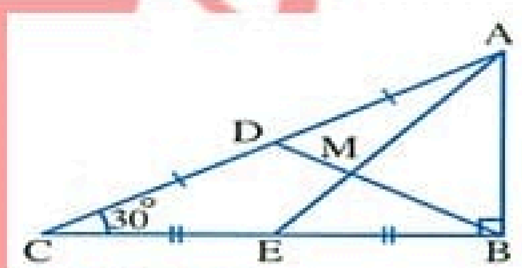


3 Δ ABC is right-angled at B

, m (∠ C) = 30° , D is the midpoint of $\overline{AC}$

, E is the midpoint of $\overline{BC}$, AC = 9 cm.

Find the length of each of : $\overline{BD}$, $\overline{BM}$ and $\overline{AB}$



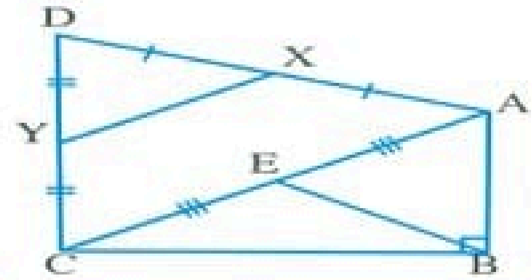
4

m (∠ ABC) = 90°

, E is the midpoint of $\overline{AC}$

and X , Y are the midpoints of $\overline{DA}$ and $\overline{DC}$

Prove that : XY = BE



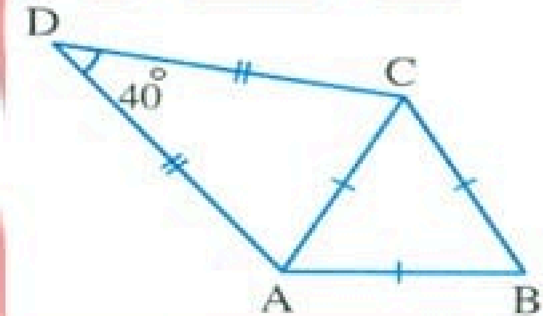
5

m (∠ D) = 40°

, DA = DC

and △ABC is an equilateral triangle.

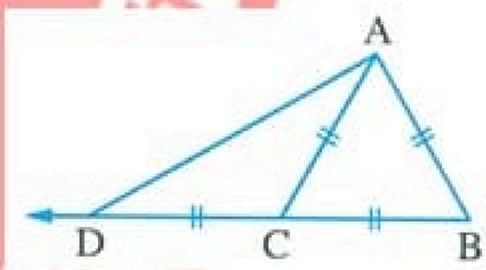
Find : m (∠ DCB)



6

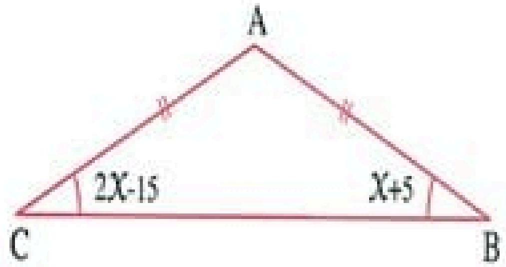
AB = AC = CB = CD

Prove that : $\overline{AB} \perp \overline{AD}$



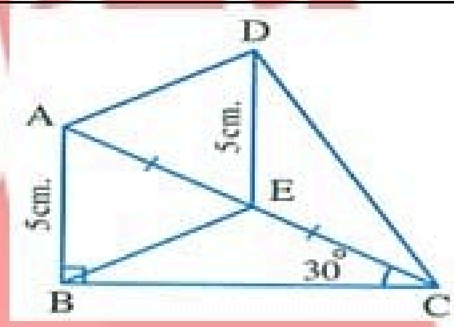
7 ABC is a triangle , AB = AC , m (∠ B) = $(X + 5)°$, m (∠ C) = $(2X - 15)°$

Find : m (∠ A) (show all of your work)

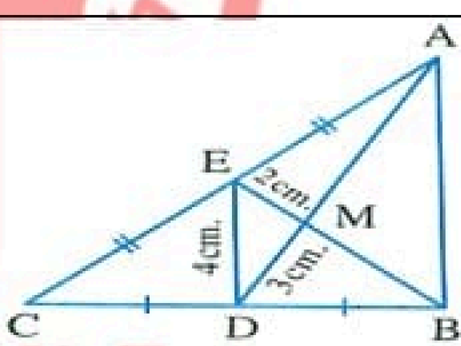


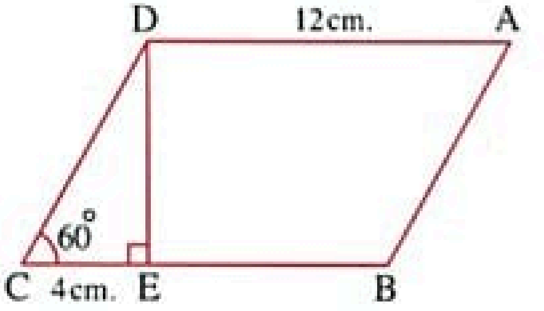
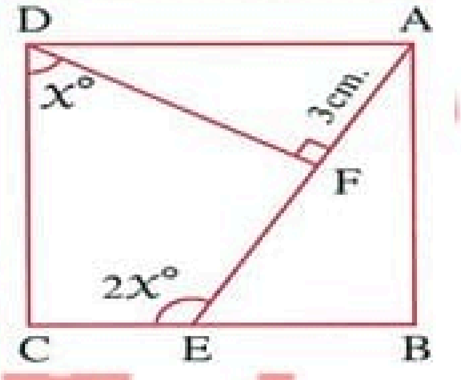
8 ABC is a right-angled triangle at B , m (∠ ACB) = 30° , AB = 5 cm. , E is the midpoint of $\overline{AC}$, if DE = 5 cm.

, **prove that :** m (∠ ADC) = 90°



9 *ABC is a triangle in which ME = 2 cm , MD = 3 cm DE = 4 cm , D , E are the midpoints of $\overline{BC}$ and $\overline{AC}$ respectively , find the perimeter of △ MAB*



10	**In the opposite figure :** ABCD is a parallelogram , m (∠ C) = 60° , $\overline{DE} \perp \overline{BC}$, AD = 12 cm. , CE = 4 cm. **Find with proof :** The perimeter of the parallelogram ABCD  ....
11	ABCD is a square , E ∈ $\overline{BC}$ where m (∠ FDC) = x° and m (∠ FEC) = 2 x° , $\overline{DF} \perp \overline{AE}$, AF = 3 cm. **Calculate :** The area of the square ABCD  ....